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Review and key of the Chinese species of the genus *Episyron* Schiødte (Hymenoptera, Pompilidae), including descriptions of two new species

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Abstract

Here, we conducted a review of the Chinese species of the spider wasp genus *Episyron* Schiødte, 1837. Two new species, *Episyron fulvimaculatus* Song & Li, **sp. nov.** and *Episyron immaculatus* Song & Ma, **sp. nov.**, from Yunnan and Inner Mongolia are described and illustrated, respectively. The male of *E. rufotibius* Anju, Girish Kumar & Thejass, 2024 is described for the first time. Additionally, three newly recorded species, *E. albonotatum* (Vander Linden, 1827), *E. rufipes* (Linnaeus, 1758), and *E. rufotibius* Anju, Girish Kumar & Thejass, 2024 are reported from Inner Mongolia, Yunnan, and Guangdong in China. The diagnoses are given for three known species and one subspecies from China. An illustrated key to Chinese species is provided.

Key Words

China, new record, new species, Pompilinae, spider wasps

Introduction

The genus *Episyron* Schiødte, 1837 (Pompilidae, Pompilinae, Episyronini) was established by Schiødte in 1837, with *Episyron rufipes* Linnaeus, 1758 designated as the type species. This genus is distributed across all six major zoogeographic regions of the world and currently comprises 85 species and 13 subspecies. The Palearctic region contains the greatest richness, with 45 species and seven subspecies, followed by the Oriental region with 18 species and the African region with ten species and one subspecies. In comparison, the Nearctic, Neotropical, and Australian regions have fewer species: eight species and five subspecies are found in the Nearctic and Neotropical regions, respectively, while the Australian region contains four species. Many species are considered endemic with only a few inhabiting the multiple zoogeographic regions. Notably, two species are distributed across both the Palearctic and Oriental regions; two species are found in both the Nearctic and Neotropical regions; and one species in the Australian, Nearctic, and Neotropical regions (Banks 1911, 1919, 1933, 1934; Arnold 1936; Yasumatsu 1937; Evans 1950, 1951, 1966, 1997; Priesner 1966, 1967; Wolf 1972; Wahis 1980; Tsuneki 1989, 1990; Elliott 2007; Loktionov and Lelej 2012, 2014, 2017; Loktionov 2016; Kim 2022; Anju et al. 2024). To date, three species and one subspecies have been reported from China: *E. arrogans* (Smith, 1873), *E. latimarginatus* Tsuneki, 1989, *E. rufotibialis* Tsuneki, 1989, and *E. vagabundus hopponis* (Matsumura, 1912) (Tsuneki 1989; He et al. 2004).

In this study, we reported two new species and three newly recorded species of *Episyron* from China. The two new species, collected from Yunnan and Inner Mongolia, are described and illustrated. Additionally, the male of *E. rufotibialis* is described for the first time, and three newly recorded species are documented from Inner Mongolia, Yunnan, and Guangdong. An illustrated key to species of *Episyron* in China is provided.

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Material and methods

The examined specimens are deposited in Yunnan Agricultural University, Kunming, China (YNAU). Specimens were studied and illustrated using an Olympus SZ-series stereomicroscope equipped with an ocular micrometer. Photographs were taken with a Keyence VHX-5000 digital microscope system and edited using Adobe Photoshop® 8.0. Terminology for wing veins and cells follows Day (1988). The following abbreviations are used in the descriptions:

SL	scape length
PL	pedicel length
F1, F2, F3, etc.	first, second and third, etc., flagellomere
UID	upper interocular distance
MID	middle interocular distance
LID	lower interocular distance
OOD	ocellocular distance
POD	postocellar distance
SMC1, SMC2	first and second submarginal cells of the fore wing
1m-cu*, *2m-cu	first and second recurrent veins
M+CuA	basal vein
cu-a	abscissae of *CuA*
S1, S2, S3, etc.	first, second, third, etc., metasomal sternum
T1, T2, T3, etc.	first, second, third, etc., metasomal tergum
SGP	subgenital plate

Taxonomy

Genus *Episyron* Schiødte, 1837

Episyron Schiødte, 1837: 341. Type species: *Sphex rufipes* Linnaeus, 1758, monotype, by original designation.

Epizuron Ashmead, 1902: 82. Subsequent misspelling of *Episyron* Schiødte, 1837.

Spilopompilus Ashmead, 1902: 81. Type species: *Pompilus* "*biguttulatus*" Fabricius, 1798 (subsequent misspelling of *Pompilus biguttatus* Fabricius, 1798), by original designation. Junior subjective synonym of *Episyron* Schiødte, 1837 according to Wahis 1986: 28.

Generic diagnosis. Body black, many species exhibiting whitish or yellowish markings on pronotum and mesosoma, legs partly or wholly rufous. In both sexes, dense brown, gray or bluish white lanceolate scales largely covering pronotum, scutellum, metanotum, mesopleura, metapleura, propodeum, hind coxa dorsally and metasomal tergum 1. Mandible with two teeth on inner margin in female, one in male. Clypeus large, malar space short or practically absent (Figs 1B, 2B, 3B, 4B, 5B, 6B, 7B, 8B, 9B, 10B, 11B, 12B, 13B, 14B). Antennae in general rather elongate, but in some males shorter. Legs strongly spinose, fore tibiae of females with a few spines and fore metatarsus with a strong comb; all claws bifid in both sexes, inner ray close to outer ray and more or less truncate; apical segment of fore tarsus unmodified, parallel–sided (Figs 1F, 3F, 4F, 6F, 8F, 9F, 11F, 13F). Fore wing with three submarginal cells, SMC2 long, SMC3 short (Figs 1E, 3E, 4E, 5E, 6E, 7E, 8E, 9E, 10E, 11E, 12E, 13E, 14E) (Evans 1950, 1966; Kim 2022; Anju et al. 2024).

Biology. Members of the genus *Episyron* are small to medium-sized predatory and parasitic wasps that prey on orb-weaver spiders (Araneidae). When hunting, the female wasp first stings and paralyzes the prey, then transports it back to the ground or carries it in flight to the vicinity of its nest, ultimately dragging the prey into the burrow (Kurczewski and Kurczewski 1973; Kurczewski and Spofford 1986; Kurczewski 2001). Adults also have the habit of visiting flowers and males are considered potential pollinators. *Episyron* species prefer open environments with sandy soils and are often found around watercourses (Wasbauer and Kimsey 1985). They typically nest in the soil, constructing short, sloping burrows. Their movements during flight and nesting are highly agile (Evans 1950, 1997; Wasbauer and Kimsey 1985).

Distribution. All major zoogeographic regions.

Key to the species of the genus *Episyron* Schiødte, 1837 from China

Females

1 Hind tibia mostly black, outer surface with yellow spots basally (Figs 6A, 7A, 8A) 2
– Hind tibia mostly reddish (Figs 1A, 2A, 3A, 4A, 5A, 9A, 10A, 11A, 12A, 13A, 14A) 3
2 Apical marginal band of fore wing narrow, not including SMC2 (Fig. 6E); median comb spine of fore metatarsus comparatively long, as long as its maximum width; spines of legs black (Fig. 6F) ..... *E. arrogans* (Smith, 1873)
– Apical marginal band of fore wing very broad, covering apical SMC2 and whole of SMC3 (Fig. 8E); median comb spine of fore metatarsus comparatively short, scarcely half as long as its maximum width (Fig. 8F); spines of legs pale brown (Fig. 8A) ..... *E. latimarginatus* Tsuneki, 1989
3 Tarsomere 1 with four long flattened outer spines, slightly widening or almost parallel-sided toward subapex (Figs 3F, 9F) 4
– Tarsomere 1 with three long flattened outer spines or three medium length, cylindrical tapering outer spines (Figs 1F, 4F, 6F, 8F, 11F) 5

4 POD: OOD = 1.34–1.67; MID 1.85–1.89 times eye width (Fig. 3B); tegulae and metasoma without spots or bands (Fig. 3A, D) ..... *E. immaculatus* Song & Ma, sp. nov.
– POD: OOD = 1.18–1.33; MID 2.48–3.11 times eye width (Fig. 9B); tegulae and metasoma with yellow spots or bands (Fig. 9A, D) ..... *E. rufipes* (Linnaeus, 1758)
5 Comb spine of fore metatarsus comparatively short, length less than twice metatarsus maximum width (Fig. 13F) 6
– Comb spine of fore metatarsus comparatively long, length exceeding twice metatarsus maximum width (Figs 1F, 4F, 11F) 7
6 Apical third of all femora, all of tibiae, spurs, tarsomere 1 and spines, tarsomere 2 partly yellowish or brown (Fig. 13A); T2–6 each with orange marks or band; squamiform pubescence on TI coppery (Fig. 13A, D) ..... *E. vagabundus hopponis* (Matsumura, 1912)
– Mid and hind legs black; TI, 2 and 5 yellow maculated; squamiform pubescence on TI silvery, mixed with weak bluish sheen ..... *E. rufotibialis* Tsuneki, 1989
7 Antenna 1-4 (5) fulvous; mesosoma in large part fulvous, basal T2–3 with wide yellow or fulvous band, T4–6 almost entirely fulvous; basal S1–4 more or less black, S4–6 almost entirely fulvous (Fig. 1A) ..... *E. fulvimaculatus* Song & Li, sp. nov.
– Antenna black; mesosoma in large part black, only some terga have yellow spots and bands (Figs 4A, 11A) 8
8 Fore tarsus with long flattened spines; fore femora apically, most mid and hind femora (all or outer), fore tibia (all or outer), mid and hind tibia reddish (Fig. 4A); F1 length 4.4–4.9 times its maximum width..... *E. albonotatum* (Vander Linden, 1827)
– Fore tarsus with cylindrical tapering outer spines; fore and mid legs black, hind tibia reddish (apically black) (Fig. 11A); F1 length 7.13–7.43 times its maximum width ..... *E. rufotibius* Anju, Girish Kumar & Thejass, 2024

Males (males are unknown for *E. immaculatus* Song & Ma, sp. nov., *E. latimarginatus* Tsuneki, 1989, and *E. rufotibialis* Tsuneki, 1989)

1 Hind tibia largely black (Fig. 7A) ..... *E. arrogans* (Smith, 1873)
– Hind tibia partly reddish (Figs 2A, 5A, 10A, 12A, 14A) 2
2 Posterior margin of pronotum and mesonotum with yellow or fulvous band or spot (Figs 2A, 14A) 3
– Posterior margin of pronotum and mesonotum without band or spot (Figs 5A, 10A, 12A) 4
3 Marks on T2-T3 basolaterally and T7 yellow brown or fulvous (Fig. 2A); F1 length 1.42–1.64 times its maximum width ..... *E. fulvimaculatus* Song & Li, sp. nov.
– Marks on T3 basolaterally (usually concealed) and T7 yellow (Fig. 14A); F1 length 2.11–2.32 times its maximum width ..... *E. vagabundus hopponis* (Matsumura, 1912)
4 Pterostigma elongated, its posterior margin parallel to anterior (Figs 10E, 12E)..... 5
– Pterostigma not elongated, its posterior margin rounded (Fig. 5E) ..... *E. albonotatum* (Vander Linden, 1827)
5 Mid legs black, hind tibia reddish (apically black); spur white; squamiform pubescence usually with bluish or yellow–green sheen (Fig. 12A, D) ..... *E. rufotibius* Anju, Girish Kumar & Thejass, 2024
– Apical mid femora, half of hind femora and mid and hind tibiae reddish; spur brown; squamiform pubescence usually brown (Fig. 10A, D) ..... *E. rufipes* (Linnaeus, 1758)

Episyron fulvimaculatus Song & Li, sp. nov.

https://zoobank.org/691E0B04-EF01-44D5-9DA0-F31C7DE10CD0

Figs 1A–F, 2A–G

Material examined. ***Holotype*:** CHINA • ♀; Yunnan, Jinghong City, Menghai County; 21°49'N, 100°28'E; 24.III–22.IV.2021; coll. Malaise trap (YNAU). ***Paratypes*:** CHINA • 2 ♀♀ 2 ♂♂; same data as for holotype, 27.IV–16.V.2018 (1 ♂), 24.III–22.IV.2019 (1 ♀), 17.V–17.VI.2019 (1 ♂), 13.I–15.II.2021 (1 ♀); coll. Malaise trap (YNAU); CHINA • 4 ♀♀ 2 ♂♂; Yunnan, Jinghong City, Menghai County, Bulang Mountain; 21°45'N, 100°26'E; 17.V–21.VI.2018 (2 ♀♀), 29.IV–28.V.2019 (2 ♀♀), 17.V20.VI.2018 (1 ♂), 28.V28.VI.2019 (1 ♂); coll. Malaise trap (YNAU); CHINA • 1 ♀; Yunnan, Dehong State, Lianghe County, Zhedao Town, Longhe Village; 24°45'N, 98°13'E; 5.V.2013; coll. Ying Tian; yellow plate (YNAU); CHINA • 3 ♀♀; Yunnan, Wenshan State, Maguan County, Mabai Town; 23°02'N, 104°41'E; 16.VII.2017; coll. Malaise trap (YNAU); CHINA • 3 ♀♀; Yunnan, Baoshan, Tengchong, Jietou Town; 25°43'N, 98°65'E; 15.VII.2006; coll. Rui Zhang; sweep net (YNAU); CHINA • 1 ♀; Yunnan, Yuxi, Chengjiang Yueliangwan Wetland Park; 24°62'N, 102°94'E; 2.IX.2023; coll. Zhizhi Liu; sweep net (YNAU).

Description. Female. Length: body 9.2–13.5 mm; fore wing 8.1–11.8 mm.

Colour. Body black, following markings fulvous: mandible at apical 1/2, maxillary palpus, antennae 1–4, sometimes 5, antennal socket, broad band on inner and outer orbits, collar, posterior margin of pronotum, square mark near hind margin of mesonotum, small spot on hind margin of scutellum and on tegulae (Fig. 1A–D). Mesosoma in large part fulvous, basal T2–3 with wide yellow or fulvous band, T4–6 almost entirely fulvous; basal S1–4 more or less black, S4–6 almost entirely fulvous (Fig. 1A).

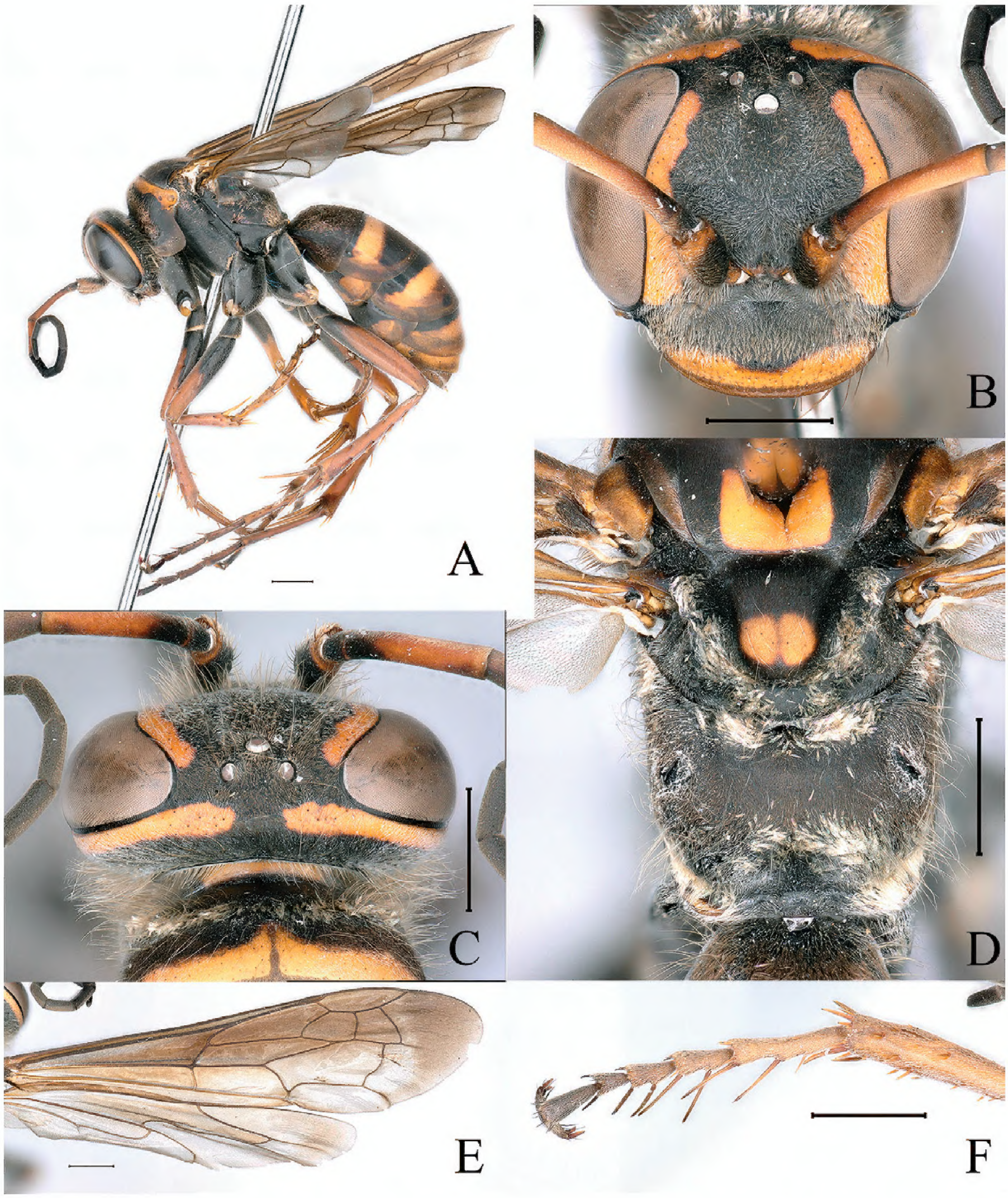

Figure 1. A–F. *Episyron fulvimaculatus* Song & Li, sp. nov., ♀, holotype. **A.** Female, lateral view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Fore wing and hind wing; **F.** Fore tarsus. Scale bar: 1.0 mm.

All coxae, trochanters and femora at basal 3/4 black, fore, mid and hind tarsomeres 5 dark brown, remainder fulvous (Fig. 1A). Wings hyaline, slightly brownish, fore and hind wings infuscate with light brown apical band, pterostigma entirely brown (Fig. 1E).

Pubescence. Mandible, clypeus, frons, vertex, gena, pronotum, propleuron, mesopleuron, propodeum and T1 with dense golden pubescence, apical metasoma with sparse black setae; pronotum, scutellum, metanotum, metapleura, metapostnotum, propodeum, dorsal surface of hind coxa and T1 with yellowish-brown squamiform pubescence, mixed metallic reflection (Fig. 1A–D).

Head. In frontal view, head width 1.12–1.13 times its height. Mandible stout with two small subapical teeth, inner tooth smaller than outer tooth. Clypeus slightly convex medially, anterior margin rounded, its width 2.14–2.33 times length (Fig. 1B). Malar space short. Area between antennal sockets convex. Frons flat, with short and inconspicuous median line (Fig. 1B). Inner orbits nearly parallel below and slightly convergent above; MID width

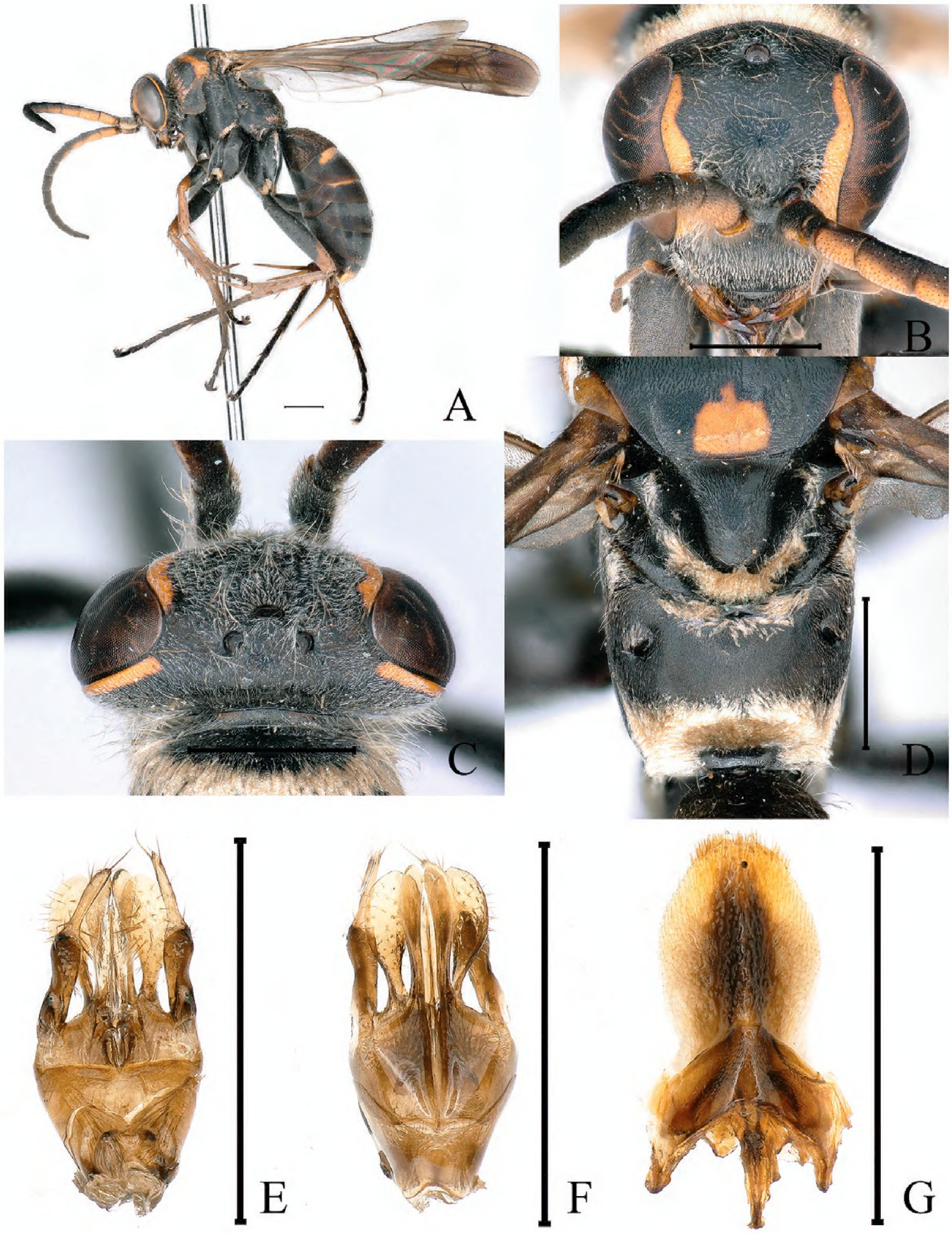

Figure 2. A–G. *Episyron fulvimaculatus* Song & Li, sp. nov., ♂, paratype. **A.** Male, lateral view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Genitalia, ventral view; **F.** Genitalia, dorsal view; **G.** Hypopygium, ventral view. Scale bar: 1.0 mm.

nearly 2.55–3.04 times eyes; LID: MID: UID = 73: 73: 51 (Fig. 1B). In dorsal view, ocelli approximately in triangle, ocellar area slightly raised; POD: OOD = 0.81–0.89 (Fig. 1C). Head with developed occipital angles, occipital carina conspicuous (Fig. 1C). In lateral view, gena 0.61–0.66 times eye width. Flagellum filiform, F1 slender, length 5.63–6.02 times its maximum width, and 2.32–2.51 times scape; SL: PL: F1: F2: F3: F4: F5 = 25: 12: 60: 42: 31: 25: 18.

Mesosoma. Pronotum length in dorsal view 0.33–0.36 times its maximum width, slightly converging toward base, posterior margin arcuate and slightly angulate medially. Mesoscutum with evident parapsidal

line, from apical to 3/4 metanotum. Mesoscutellum and metanotum conspicuously convex medially. Metapostnotum narrow medially, and posterior margin arcuately expanded, and its length nearly 0.27–0.33 times metanotum (Fig. 1D). Propodeum slightly convex in profile, with uniform arcuate transition, length 0.68–0.71 of its maximum width (Fig. 1D).

Wings. Marginal cell of fore wing nearly as long as its length from wing tip (Fig. 1E). Pterostigma slender, rounded posteriorly. Fore wing with three submarginal cells, SMC3 apparently greater than SMC2 (Fig. 1E). SMC2 receiving crossvein *1m-cu* at basal 0.53–0.56, SMC3 receiving crossvein *2m-cu* at basal 0.61–0.68 (Fig. 1E). Hind wing crossvein *cu-a* arc-like, *M+CuA* vein fork before intersection of *cu-a* and *M+CuA* (Fig. 1E).

Legs. Fore tarsus with cylindrical tapering spines, tarsomere 1 outside with three outer spines, tarsomere 2, 3 with two outer spines, tarsomere 4 with one outer spine, tarsomere 5 without spine; two spines on ventral surface of tarsomere 1; apical spine of tarsomere 1 slightly exceeding apex of tarsomere 2; tarsomere 2 apical spine extended beyond apex of tarsomere 3, a row of small spines on ventral surface of tarsomeres 1–4 (Fig. 1F). Long spur of hind tibia nearly 0.75–0.84 times metatarsus. Tarsal claws symmetrical and bifid, inner tooth broad and obliquely truncated (Fig. 1F).

Metasoma. Metasoma without petiole, apex of T6 slightly compressed.

Male. Body length 7.3–9.5 mm, fore wing 7.6–8.3 mm. Similar to female except: mandible red-brown at apical 1/2, tegulae red-brown (Fig. 2B). Following markings fulvous: inner and outer orbits, antennae 3–8 segments ventrally, posterior margin of pronotum, square mark near hind margin of mesoscutum; basal T2–3 band; T7 almost entirely yellow brown or fulvous (Fig. 2A–D). Femora apically and tibiae reddish brown, tarsus brownish black (Fig. 2A). Squamiform pubescence usually brown, mixed with pink and metallic sheen (Fig. 2D). Head width 1.15–1.17 times its height (Fig. 2B). Mandible with one small subapical tooth. Clypeus width 1.92–2.02 times length; MID width nearly 2.48–2.51 times eyes; LID: MID: UID = 46: 56: 48 (Fig. 2B); POD: OOD = 0.73–0.86. Gena 0.53–0.62 times eye width. F1 nearly 1.42–1.64 times as long as width, SL: PL: F1: F2: F3: F4: F5 = 15: 5: 17: 23: 21: 19: 18. Pronotum length 0.31–0.37 times its maximum width, metapostnotum length nearly 0.23–0.27 times metanotum; propodeum length 0.50–0.58 times its maximum width (Fig. 2D). SMC2 receiving crossvein *1m-cu* at basal 0.53–0.57, SMC3 receiving crossvein *2m-cu* at basal 0.64–0.66. Fore tarsus without comb spines, long spur of hind tibia nearly 0.84–0.87 times metatarsus. Metasoma lanceolate, slightly narrower than mesosoma. Genitalia: paramere narrow and long, with bristles apically; apical 2/3 of volsella broad, ventral surface with a few bristles; SGP in ventral view narrowing toward apex, ventral surface with dense, short setae apically.

Distribution. China: Yunnan (Xishuangbanna State, Dehong State, Baoshan City).

Etymology. The specific epithet *fulvimaculatus* originates from the Latin words "*fulv-*" and "*maculatus*", referring to the many fulvous spots or bands throughout the body.

Remarks. The new species is similar to *Episyron vagabundus hopponis* (Matsumura, 1912), but can be separated from it by the following characteristics:

Female of *E. fulvimaculatus*: F1 slender, length 5.63–6.02 times its maximum width; POD < OOD; pterostigma rounded posteriorly (Fig. 1E); comb spine of fore tarsomere 1 comparatively long (Fig. 1F). In male, basolateral marks of T2-T3 and mark on T7 yellow brown or fulvous (Fig. 2A); F1 length 1.42–1.64 times its maximum width.

In *Episyron vagabundus hopponis* (Matsumura, 1912) (female): F1 length 6.78–7.62 times its maximum width; POD > OOD; pterostigma elongated, posterior margin parallel to anterior (Fig. 13E); comb spine of fore tarsomere 1 comparatively shorter (Fig. 13F). In male, basolateral marks of T3 (usually concealed) and mark on T7 yellow (Fig. 14A); F1 length 2.11–2.32 times its maximum width.

Episyron immaculatus Song & Ma, sp. nov.

https://zoobank.org/CFDF90CF-2FE5-43F7-B44D-6E4BDA4EDA35

Fig. 3A–F

Material examined. ***Holotype*:** CHINA • ♀; Inner Mongolia, Helan Mountain, Xiangchizi; 38°49'N, 105°52'E; 7.VIII.2010; coll. Fangzhou Ma; sweep net (YNAU); ***Paratypes*:** CHINA • 1 ♀; Inner Mongolia, Helan Mountain, Xiazigou; 39°12'N, 105°42'E; 9.VIII.2010; coll. Fangzhou Ma; sweep net (YNAU); CHINA • 1 ♀; Inner Mongolia, Helan Mountain National Nature Reserve; 38°21'N, 105°44'E; 26.VII.2010; coll. Dingji Zhang, sweep net (YNAU).

Description. Female. Length: body 10.5–12.5 mm; fore wing 8.1–9.8 mm.

Colour. Body black, yellow marks as follows: narrow stripes along inner orbit in median part of face in frontal view, stripes along posterior margin of eyes (Fig. 3B, C). Mid, hind femora (apical black) and tibiae reddish, spur brown (Fig. 3A). Fore wings slightly dark, with brownish apical band (Fig. 3E).

Pubescence. Mandible, scape, vertex, gena, pronotum, propodeum and apical metasoma with sparse black setae; pronotum, scutellum, metanotum, metapleura, metapostnotum, propodeum, dorsal surface of hind coxa and T1 with unevenly distributed, brown squamiform pubescence (Fig. 3A–D).

Head. In frontal view, head width 1.17–1.20 times its height (Fig. 3B). Mandible slender, with two subapical teeth. Clypeus slightly convex medially, anterior margin rounded, its width 1.95–2.11 times length (Fig. 3B). Malar space short. Area between antennal sockets convex. Frons flat, with long and conspicuous median line, extending to anterior ocellus (Fig. 3B). Inner orbits nearly parallel below and slightly convergent above; MID width 1.85–1.89 times eyes; LID: MID: UID = 68: 69: 50 (Fig. 3B). In dorsal view, ocelli approximately in obtuse triangle, ocellar

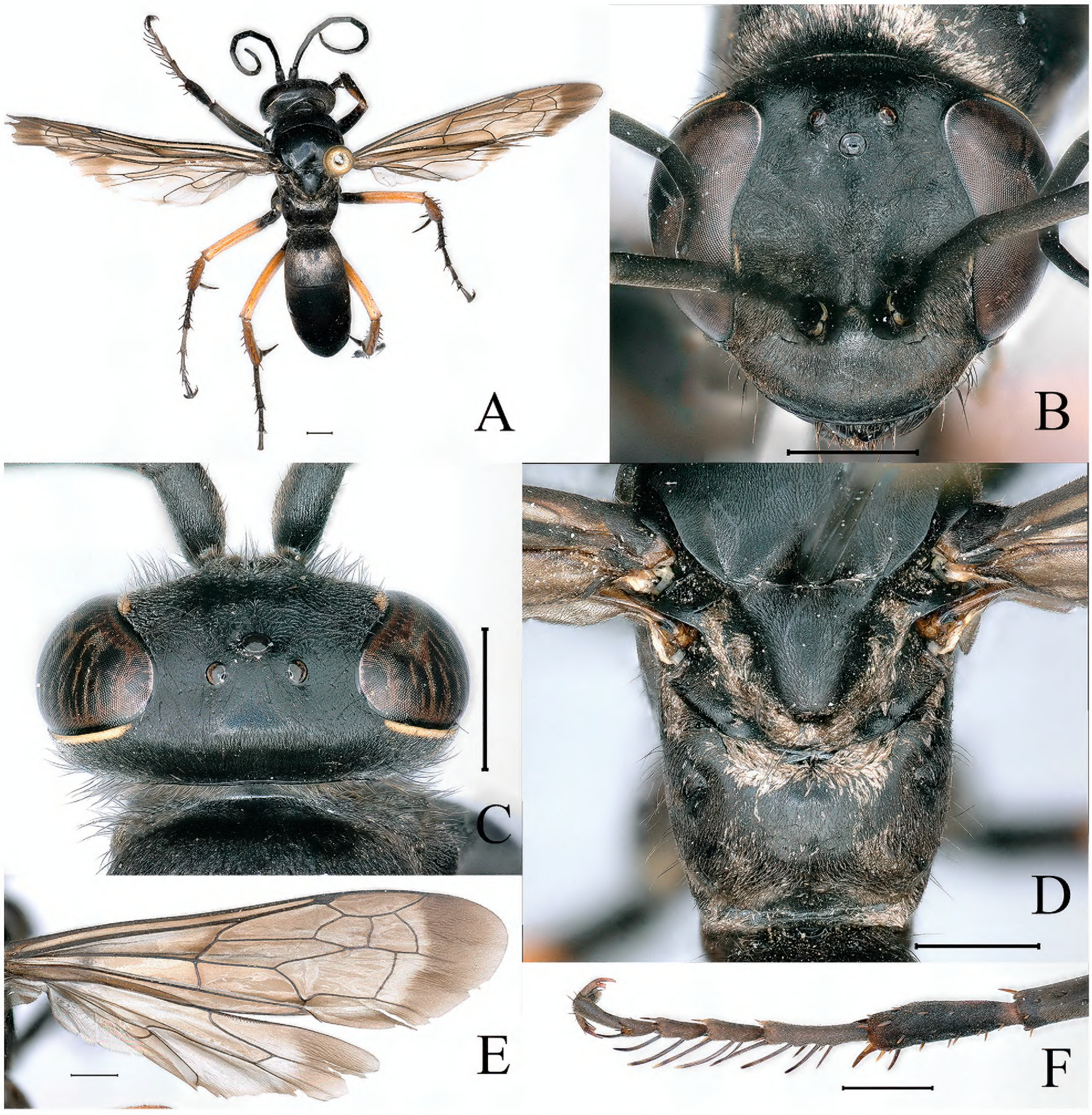

Figure 3. A–F. *Episyron immaculatus* Song & Ma, sp. nov., ♀, holotype. **A.** Female, dorsal view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Fore wing and hind wing; **F.** Fore tarsus. Scale bar: 1.0 mm.

area slightly raised; POD: OOD = 1.34–1.67 (Fig. 3C). Head with developed occipital angles, occipital carina conspicuous (Fig. 3C). In lateral view, gena 0.26–0.28 times eye width. Flagellum filiform, F1 slender, length 5.25–5.78 times its maximum width, and 1.62–1.73 times scape; SL: PL: F1: F2: F3: F4: F5 = 31: 10: 52: 37: 33: 30: 26.

Mesosoma. Pronotum length in dorsal view 0.43–0.58 times its maximum width, slightly converging toward base, posterior margin arcuate and slightly angulate medially. Mesoscutum with evident parapsidal line, from apical to 3/4 metanotum (Fig. 3A). Mesoscutellum and metanotum conspicuously convex medially. Metapostnotum narrow medially, and posterior margin arcuately expanded, and its length nearly 0.33–0.45 times metanotum (Fig. 3D). Propodeum slightly convex in profile, with uniform arcuate transition, length 0.74–0.80 of its maximum width (Fig. 3D).

Wings. Marginal cell of fore wing nearly as long as its length from the wing tip (Fig. 3E). Pterostigma short, its posterior margin rounded (Fig. 3E). Fore wing with three submarginal cells, SMC3 apparently greater than SMC2 (Fig. 3E). SMC2 receiving crossvein *1m-cu* at basal 0.61–0.63, SMC3 receiving crossvein *2m-cu* at basal 0.54–0.60 (Fig. 3E). Hind wing crossvein *cu-a* arc-like, *M+CuA* vein fork before intersection of *cu-a* and *M+CuA* (Fig. 3E).

Legs. Fore tarsus with flattened spines, slightly widening or almost parallel-sided toward subapex (Fig. 3F). Tarsomere 1 outside with four outer spines, first spine

shorter; tarsomere 2, 3 with two outer spines; tarsomere 4 with one outer spine; tarsomere 5 without spine; three spines on ventral surface of tarsomere 1; apical spine of tarsomere 1 exceeding apex of tarsomere 2; tarsomere 2 apical spine extended beyond apex of tarsomere 3, a row of small spines on ventral surface of tarsomeres 1–4 (Fig. 3F). Long spur of hind tibia 0.80–0.82 times of metatarsus. Tarsal claws symmetrical and bifid, inner tooth broad and obliquely truncated (Fig. 3F).

Metasoma. Metasoma without petiole, apex of T6 slightly compressed (Fig. 3A).

Male. Unknown.

Distribution. China: Inner Mongolia (Alashan).

Etymology. The specific epithet *immaculatus* originates from the prefix "*im-*" and the Latin word "*maculatus*", and refers to the black metasoma, without any spots or bands.

Remarks. The new species clearly differs from *Episyron rufipes* (Linnaeus, 1758) and other congeners by the following characteristics:

Female of *E. immaculatus*: F1 length 5.25–5.78 times its maximum width; POD: OOD = 1.34–1.67 (Fig. 3A); mid, hind femora (apical black) and tibia reddish (Fig. 3A); pterostigma short, its posterior margin rounded (Fig. 3E); pronotum, mesonotum and metasoma black, without any spots or bands (Fig. 3A, D).

In *Episyron rufipes* (Linnaeus, 1758) (female): F1 length 5.78–6.5 times its maximum width; POD: OOD = 1.18–1.33 (Fig. 9C); apical 2/3 of mid femora, hind femora (basal black), mid and hind tibia reddish (Fig. 9A); pterostigma elongated, its posterior margin parallel to anterior one (Fig. 9E); a yellow spot on tegulae, paired basolateral roundish spots on T2, paired basal transverse large spots on T3 (sometimes connected), spots on T4-5 usually hidden, and roundish light yellow spot on T6 basally (Fig. 9A, D).

New records for China

Episyron albonotatum (Vander Linden, 1827)

Figs 4A–F, 5A–H

Pompilus albonotatus Vander Linden, 1827: 328, ♀. Type locality: «en Dalmatie» [Croatia].

Episyron albonotatum: Jakubzik, 1998: 254, ♀♂.

Episyron ordinarius corsicus Priesner, 1965–66: 42, ♀ (Zigliana).

Episyron albonotatum sardonium Priesner; Wolf 1978: 75, ♀♂ (Aleria, Asco, Motifao).

Material examined. CHINA • 2 ♀♀; Inner Mongolia, Liangcheng County, Daihai; 40°57'N, 112°69'E; 6.IX.2013; coll. Li Jiang; sweep net (YNAU); CHINA • 1 ♀; Inner Mongolia, Helan Mountain, Xiangchizi; 38°49'N, 105°52'E; 9.VIII.2010; coll. Fangzhou Ma, sweep net (YNAU); CHINA • 1 ♂; Inner Mongolia, Tongliao Forest Park; 43°65'N, 112°32'E; 12.VII.2006; coll. Haiyan Zhang; sweep net (YNAU); CHINA • 1 ♂; Inner Mongolia, Tongliao City, Daqinggou National Nature Reserve; 42°43'N, 112°08'E; 11.VII.2006; coll. Ming Luo; sweep net (YNAU); CHINA • 1 ♂; Inner Mongolia, Hailaer National Forest Park; 49°21'N, 123°45'E; 3.VII.2006; coll. Ming Luo; sweep net (YNAU).

Diagnosis. Female. Body length 6.8–12.3 mm; fore wing 6.2–10.5 mm. Body largely black, following markings yellow: narrow and long stripes along inner and outer orbits, one spot on tegulae, and paired roundish spots on T2-3 basolaterally; light yellow spots on T4-5 usually hidden (Fig. 5A, B). Apex of fore femora, most of mid and hind femora and all tibiae reddish; spur brown; squamiform pubescence usually brown (Fig. 5A, D). Fore wings slightly dark, with brownish apical band; pterostigma rounded posteriorly (Fig. 5E). Tarsomere 1 with three long flattened outer spines, slightly widening or almost parallel-sided toward subapex (Fig. 5F). POD: OOD = 1.0–1.1; F1 length 4.4–4.9 times its maximum width. **Male.** Body length 7.0–9.6 mm; fore wing 5.4–7.2 mm. Body largely black, following markings yellow: narrow stripes along posterior margin of eyes, indistinct spots on inner orbits; paired large yellow spots on T3 basolaterally (sometimes connected), and entirely on T7 (Fig. 6A–C). Hind tibia reddish (apically black) (Fig. 6A). Squamiform pubescence usually white (Fig. 6D). POD: OOD = 1.0; F1 length 1.45–1.56 times its maximum width (Loktionov and Lelej 2014).

Distribution. Palearctic region: France, Germany, Iran, Kazakhstan, Mongolia, Morocco, Russia, Syria, Turkey, Turkmenistan, Uzbekistan, Kyrgyzstan, Tajikistan, China (Inner Mongolia) (Junco and Reyes 1963; Wolf and Moczar 1995; Wolf 1998, 2003; Loktionov and Lelej 2014, 2017).

Episyron arrogans (Smith, 1873)

Figs 6A–F, 7A–H

Pompilus arrogans Smith, 1873: 187, ♀. Type locality: "Hiogo" [Japan, Honshu].

Pompilus funereipes Costa, 1874: 30, tab. 7(bis), fig. 5, ♀. Lectotype, ♀, "*P. funereipes*, Napoli" [Italy], designated by Wolf 1981c: 32. Junior subjective synonym of *Pompilus arrogans* Smith, 1873 according to Wahis 1986: 28.

Pompilus sapporensis Matsumura, 1912: 182, ♀. Syntypes, ♀, "Sapporo (Hokkaido)" [EIHU]. Junior subjective synonym of *Pompilus arrogans* Smith, 1873 according to Yasumatsu 1937:74.

Episyron tripunctatus: Gussakovskij 1932: 42 (misidentification).

Episyron arrogans: Kim 1970: 558, ♀ (S Korea: Hwacheon); Lelej et al. 1994: 143, ♀♂, (S Korea: Gyeonggi-do, Gangwon-do; N Korea: Komunsan).

Episyron arrogans: Lelej, Yamane, 1992: 107, ♀♂.

Material examined. CHINA • 1 ♀; Hebei, Xinglong County, Wulingshan National Nature Reserve; 40°31'N, 117°20'E; 29.VIII.1973; coll. Jikun Yang, sweep net (YNAU); CHINA • 6 ♀♀2 ♂♂; Hebei, Xiaowutaishan; 39°56'N, 114°58'E; 17–22.VI.2009; coll. Zhenhua Zu; sweep net (YNAU); CHINA • 6 ♂♂; Shanxi, Qinshui

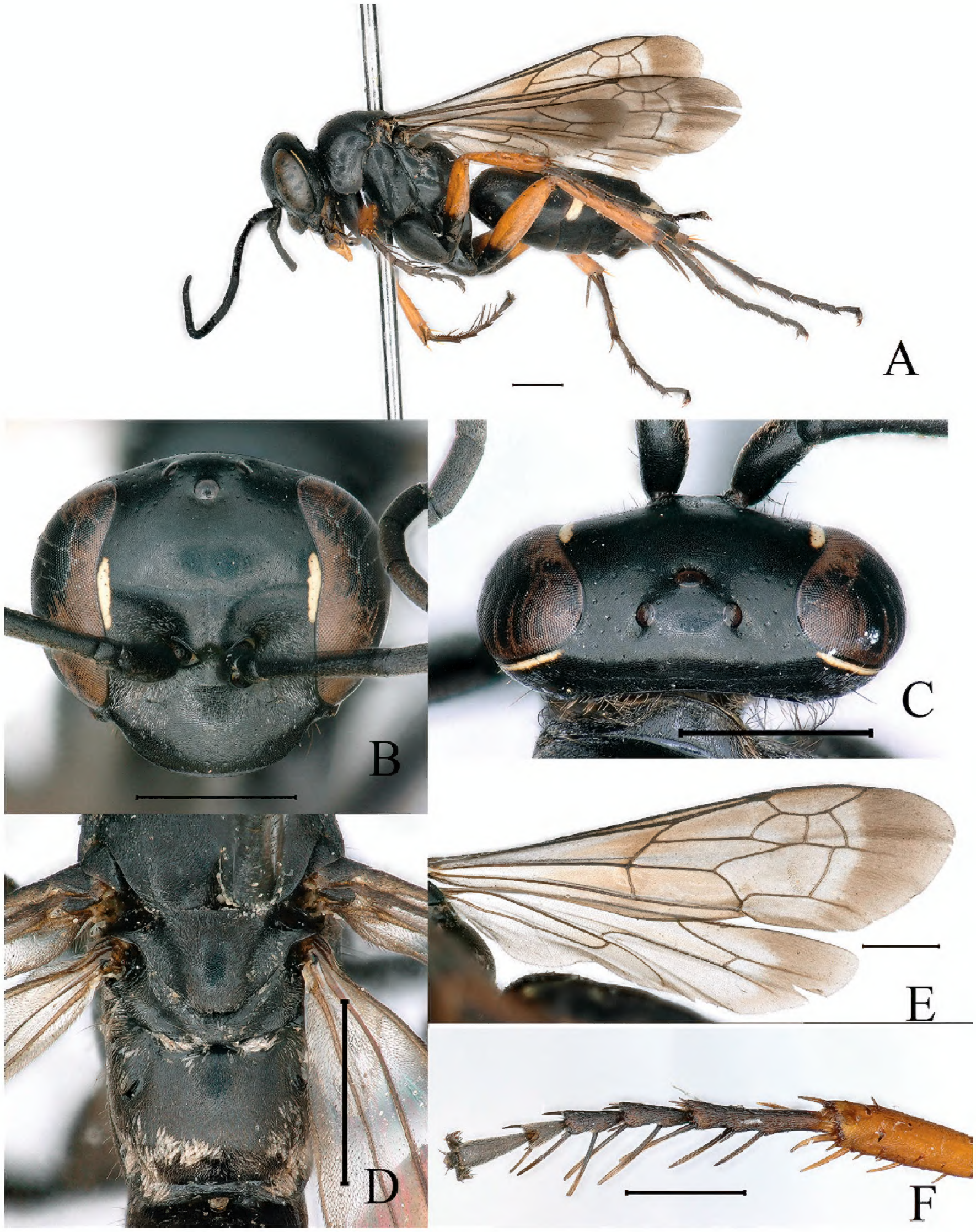

Figure 4. A–F. *Episyron albonotatum* (Vander Linden, 1827), ♀. **A.** Female, lateral view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Fore wing and hind wing; **F.** Fore tarsus. Scale bar: 1.0 mm.

County; 35°26'N, 113°47'E; 22.V.2012; coll. Li Jian; sweep net (YNAU); CHINA • 1 ♂; Yunnan, Zhaotong City, Ludian County; 26°12'N, 103°17'E; 18.VII.2016; coll. Yuxiang Chen; sweep net (YNAU); CHINA • 1 ♂; Heilongjiang, Yichun City, Fenglin National Nature Reserve; 48°06'N, 128°61'E; 23.VII.2008; coll. Yiping Wang; sweep net (YNAU).

Diagnosis. Female. Body length 10.1–13.7 mm; fore wing 8.0–11.6 mm. Body largely black, following markings whitish yellow: narrow stripes along inner orbit and posterior margin of eyes, posterior margin of pronotum (medially interrupted), a spot on tegulae, paired basolateral roundish spots on T1, paired basal transverse spots on T2, T3 and T5 (sometimes

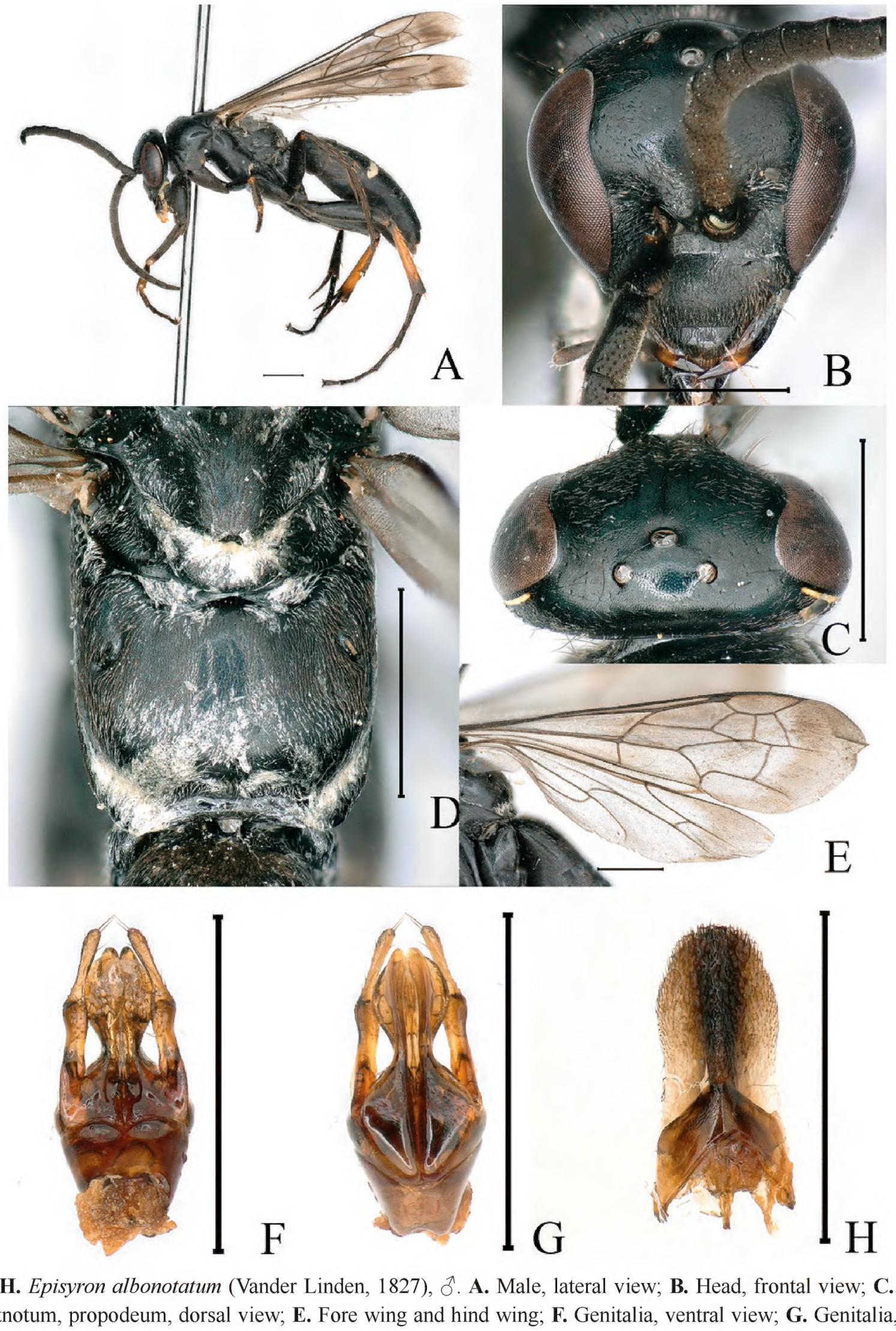

Figure 5. A–H. *Episyron albonotatum* (Vander Linden, 1827), ♂. **A.** Male, lateral view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Fore wing and hind wing; **F.** Genitalia, ventral view; **G.** Genitalia, dorsal view; **H.** Hypopygium, ventral view. Scale bar: 1.0 mm.

connected), dorsobasal spot on hind tibia (Fig. 6A–D). Spur brown; squamiform pubescence usually brown (Fig. 6D). **Male**. Body length 7.6–10.5 mm; fore wing 6.8–8.0 mm. In addition to spots seen in female, basal transverse line (or shortly interrupted medially) on T2, T3 and T7 whitish yellow; ventral face of fore tibia and basal half of hind tibia reddish yellow (Fig. 7A); spur white, and ventral faces of antennal flagellomeres brownish (Smith 1873; Bingham 1897; Kim 2022; Anju et al. 2024).

Distribution. Palearctic region: European part (Centre, North Caucasus), Eastern Siberia (Irkutsk Prov.), Far East (Amur Prov., Khabarovsk Terr., Primorskii Terr., Kurils), Europe (Western, Southern, Eastern), Turkey, China (Heilongjiang, Liaoning, Hebei, Henan, Shanxi, Jiangxi, Zhejiang, Fujian, Yunnan), South Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima, Izu, Ryukyu); Oriental region: China, Philippines (Bingham 1897; Wahis 2007; Amiresmaeili et al. 2011; Ghahari et al. 2014; Loktionov and Lelej 2014, 2017; Kim 2022; Anju et al. 2024).

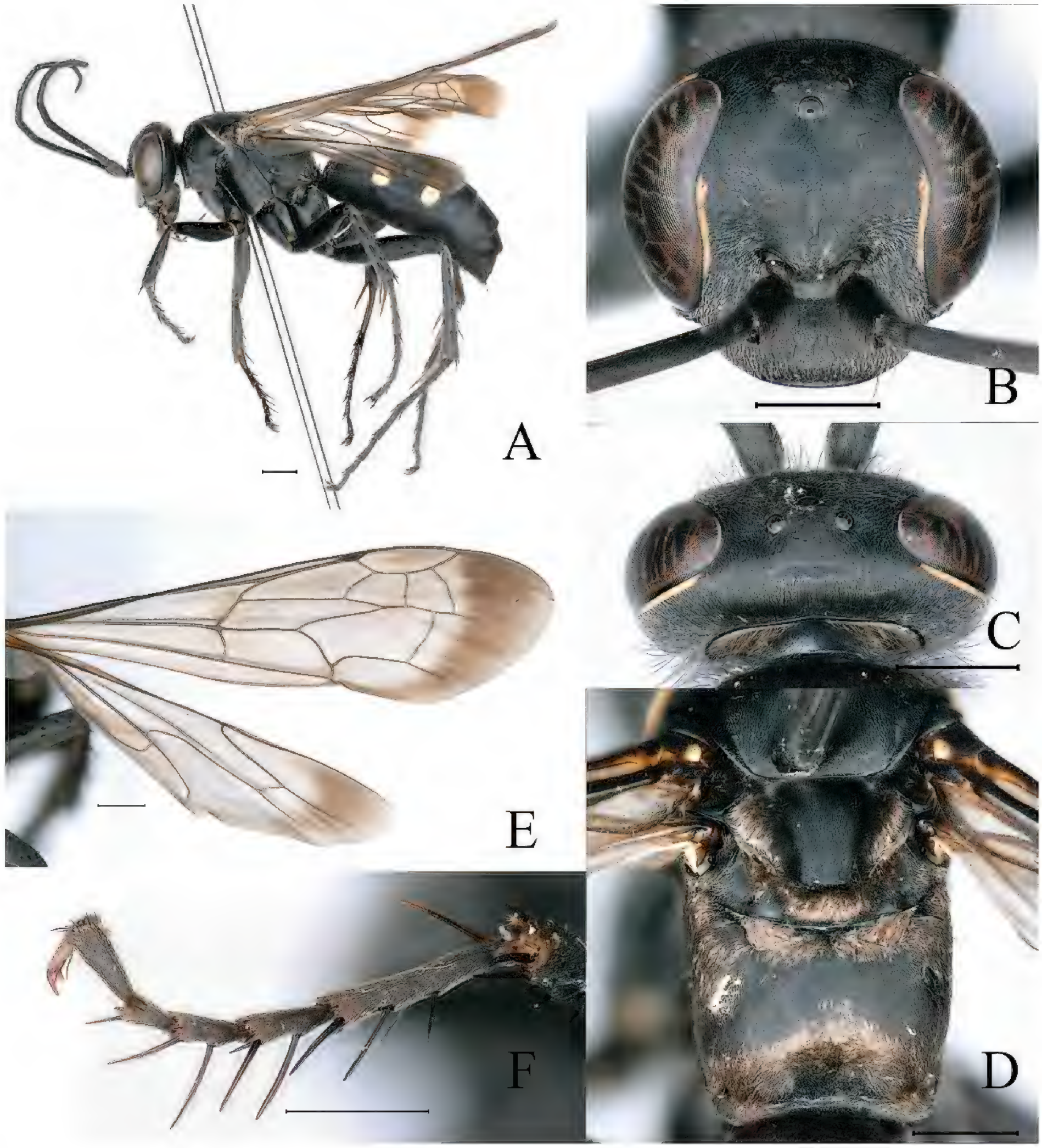

Figure 6. A–F. *Episyron arrogans* (Smith, 1873), ♀. **A.** Female, lateral view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Fore wing and hind wing; **F.** Fore tarsus. Scale bar: 1.0 mm.

Episyron latimarginatus Tsuneki, 1989

Fig. 8A–F

Episyron latimarginatus Tsuneki, 1989: 111.

Material examined. CHINA • 1 ♀; Yunnan, Wenshan State, Maguan County; 22°45'N, 103°89'E; 14.VII. 2017; coll. Malaise trap (YNAU); CHINA • 3 ♀♀; Yunnan, Jinghong City, Menghai County, Guanggang Village; 21°49'N, 100°29'E; IX.2018–IX.2020; coll. Malaise trap (YNAU); CHINA • 1 ♀; Yunnan, Qujing City, Maguohe Town; 25°46'N, 103°40'E; 20.VII.2005; coll. Kai Wu; sweep net (YNAU); CHINA • 1 ♀; Guangdong, Huizhou City, Xiangtou Mountain National Nature Reserve; 23°14'N, 114°21'E, 8.V.2010; coll. Huayan Chen; sweep net (SCAU); CHINA • 1 ♀; Guangdong, Huizhou City, Nankun Mountain; 23°64'N, 113°89'E; 4–6.VI.2011; coll. Zaifu Xu; sweep net (SCAU); CHINA • 1 ♀; Guangxi, Guilin City, Yanshan District, Jinhua Tea Garden; 25°07'N, 110°31'E; 15.VI.2020; coll. Jinxia Gao; sweep net (YNAU); CHINA • 1 ♀; Guangxi, Wuming District, Daming Mountain; 23°44'N, 108°47'E; 22.V.1963; coll. Jikun Yang, sweep net (YNAU).

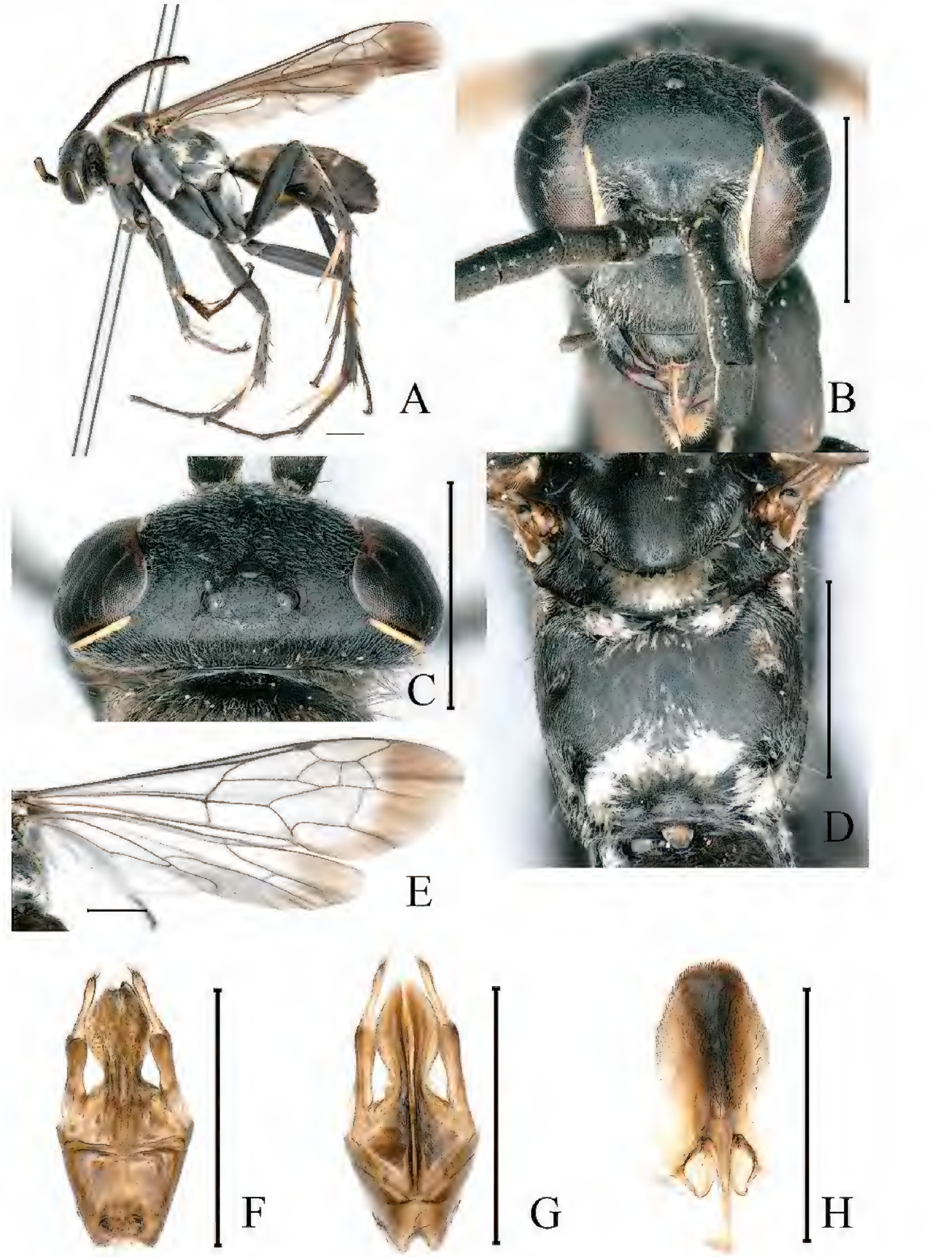

Figure 7. A–H. *Episyron arrogans* (Smith, 1873), ♂. **A.** Male, lateral view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Fore wing and hind wing; **F.** Genitalia, ventral view; **G.** Genitalia, dorsal view; **H.** Hypopygium, ventral view. Scale bar: 1.0 mm.

Diagnosis. Female. Body length 9.1–14.2 mm; fore wing 8.6–12.3 mm. Body largely black, following markings yellow: broad band on inner and outer orbits, broad band on clypeus apically, collar, posterior margin of pronotum, square mark near hind margin of mesonotum, a spot on tegulae, paired basal transverse spots on T2, T3 and T5, and dorsobasal spot on hind tibia (Fig. 8A–D); spines of legs pale brown, spurs more or less brownish (Fig. 8A); fore wings slightly dark, and with brownish apical band, covering apical SMC2 and whole of SMC3 (Fig. 8E) (Tsuneki 1989).

Male. Unknown.

Distribution. China (Tsuneki 1989; He et al. 2004).

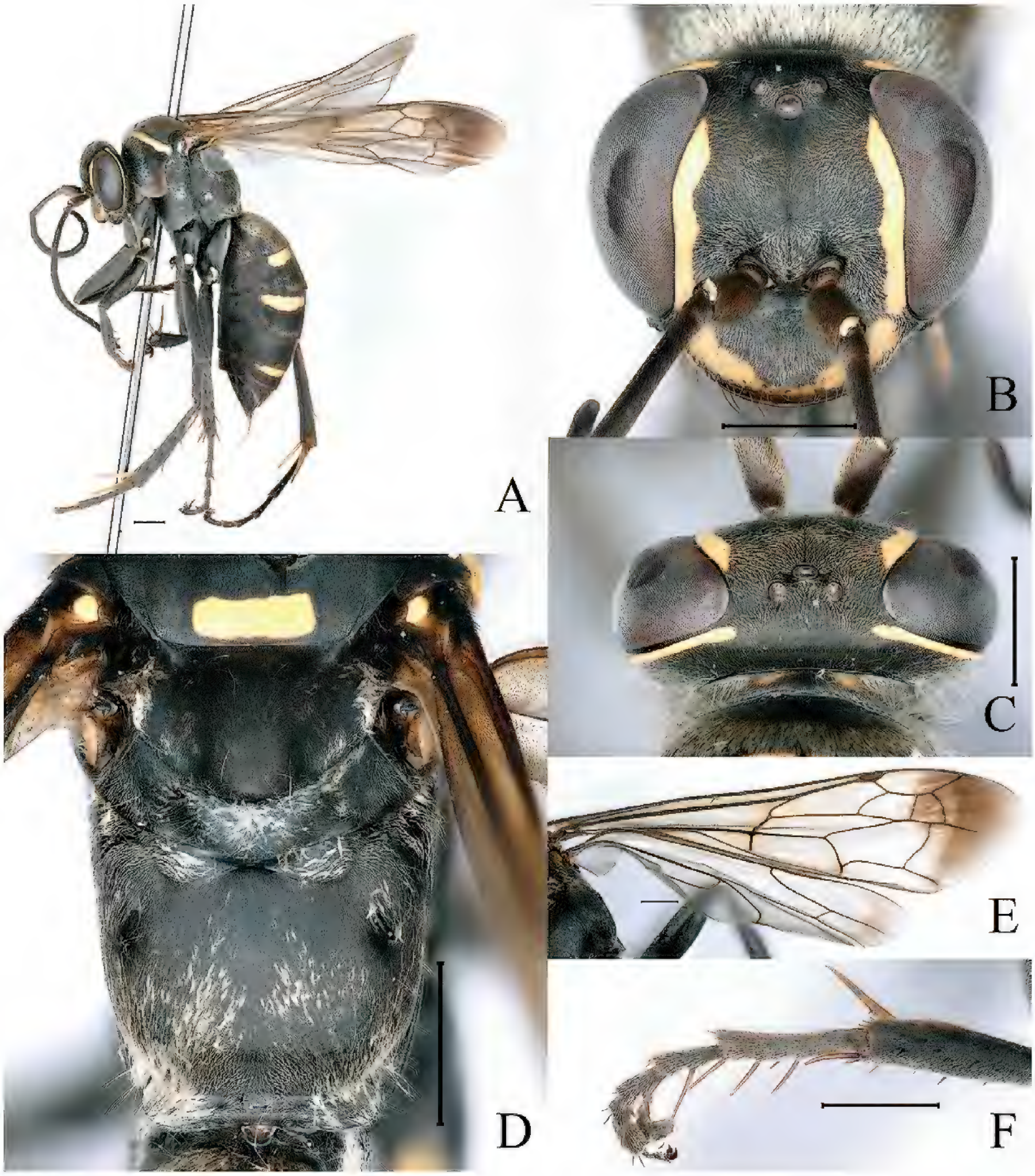

Figure 8. A–F. *Episyron latimarginatus* Tsuneki, 1989, ♀. **A.** Female, lateral view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Fore wing and hind wing; **F.** Fore tarsus. Scale bar: 1.0 mm.

Episyron rufipes (Linnaeus, 1758)

Figs 9A–F, 10A–H

Sphex rufipes Linnaeus, 1758: 571. Lectotype, ♀, "in Europa" (Sweden), designated by Day 1979: 71 [CLS].

Pompilus karafutonis Matsumura, 1911: 100, ♀. Holotype, ♀, "Chipsani" [Russia, southern Sakhalin, Ozersky, 14 km E of Korsakov] [EIHU]. Junior subjective synonym of *Sphex rufipes* Linnaeus, 1758 according to Yasumatsu 1937: 73.

Episyron rufipes (Linné); Junco and Reyes 1963: 494 (Ajaccio).

Episyron rufipes sardoum Wolf, 1978: 75, ♀♂ (Aleria, Porto Pollo, St–Florent, Taravo).

Material examined. CHINA • 14 ♀♀ 7 ♂♂; Inner Mongolia, Liangcheng County, Daihai; 40°57'N, 112°69'E; 6.IX.2013; coll. Li Jiang; sweep net (YNAU); CHINA • 8 ♀♀ 3 ♂♂; Inner Mongolia, Wuliangsuhai Wetland; 40°56'N, 108°58'E; 7.IX.2013; coll. Li Jiang, Jiang Zhu; sweep net (YNAU); CHINA • 1 ♀ 2 ♂♂; Inner Mongolia, Helan Mountain, Xiangchizi; 38°49'N, 105°52'E; 25.VIII.2013; coll. Li Jiang; sweep net (YNAU); CHINA • 1 ♀; Inner Mongolia, Hailar; 38°49'N, 105°52'E; 9.VII.2006; coll. Peng Wang; sweep net (YNAU); CHINA • 2 ♂♂; Inner Mongolia, Tongliao Forest Park; 43°65'N, 112°32'E; 12.VII.2006; coll. Ming Luo; sweep net (YNAU).

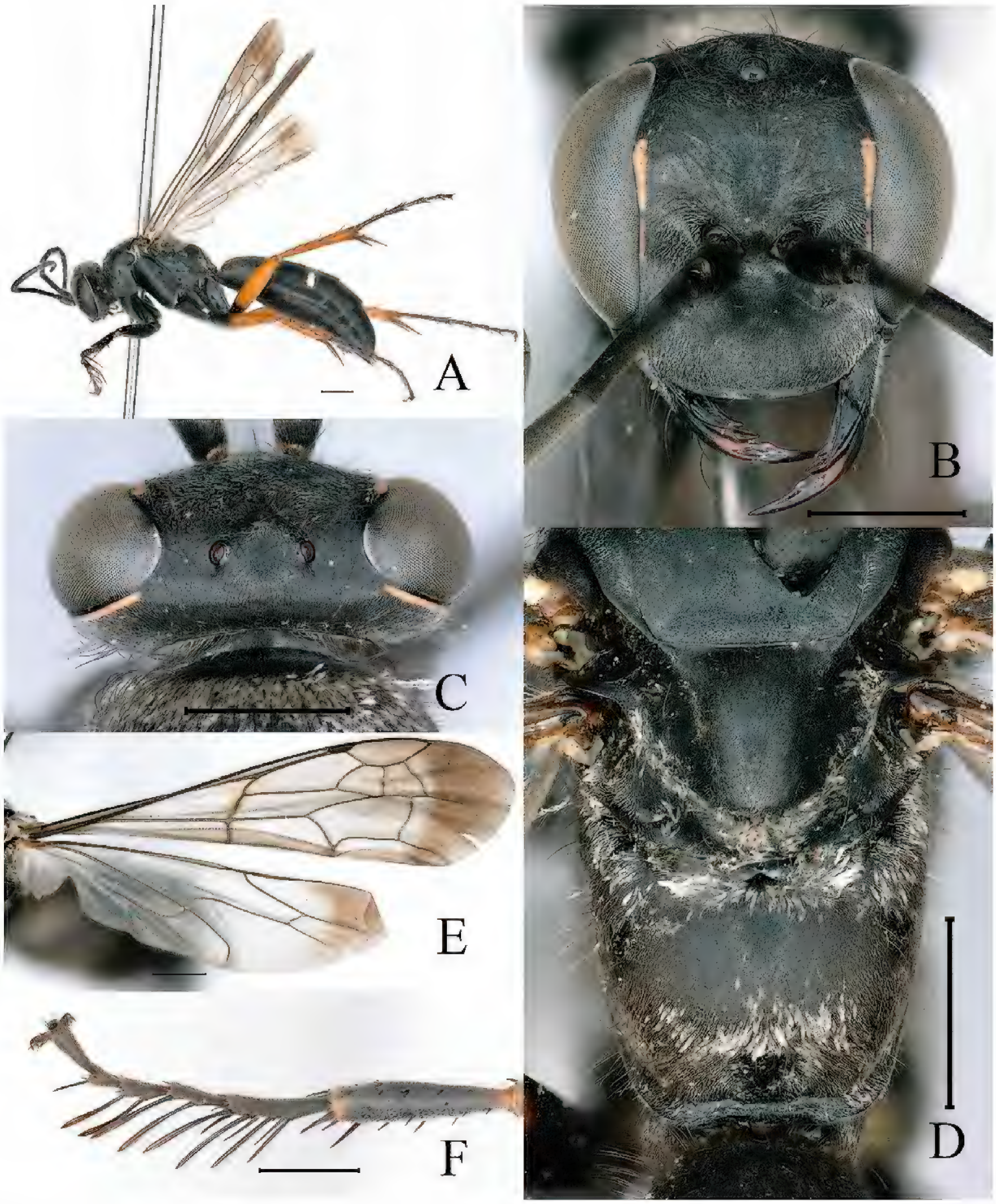

Figure 9. A–F. *Episyron rufipes* (Linnaeus, 1758), ♀. **A.** Female, lateral view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Fore wing and hind wing; **F.** Fore tarsus. Scale bar: 1.0 mm.

Diagnosis. Female. Body length 7.5–10.3 mm; fore wing 6.2–9.8 mm. Body largely black, following markings creamy yellow: narrow band on inner and outer orbits; a spot on tegulae, paired basolateral roundish spots on T2, paired basal transverse large spots on T3 (sometimes connected), and roundish spot on T6 basally, light yellow spots on T4-5 usually hidden (Fig. 9A–D). Apical 2/3 of mid femur, hind femur (basal black), mid and hind tibia reddish; spur brown; squamiform pubescence usually brown (Fig. 9A, D). Forewing, except for apical dark area, largely hyaline; pterostigma elongated, its posterior margin parallel to anterior one (Fig. 9E). Tarsomere 1 with four long flattened outer spines, slightly widening or almost parallel-sided toward subapex (Fig. 9F). POD: OOD = 1.18–1.33; F1 length 5.78–6.5 times its maximum width. **Male.** Body length 6.2–7.8 mm; fore wing 5.3–6.5 mm. Body largely black, following markings creamy yellow: narrow and long stripes along inner and outer orbits; spot on tegulae; paired roundish spots on T2-3 basally (one on T3 connected) and the

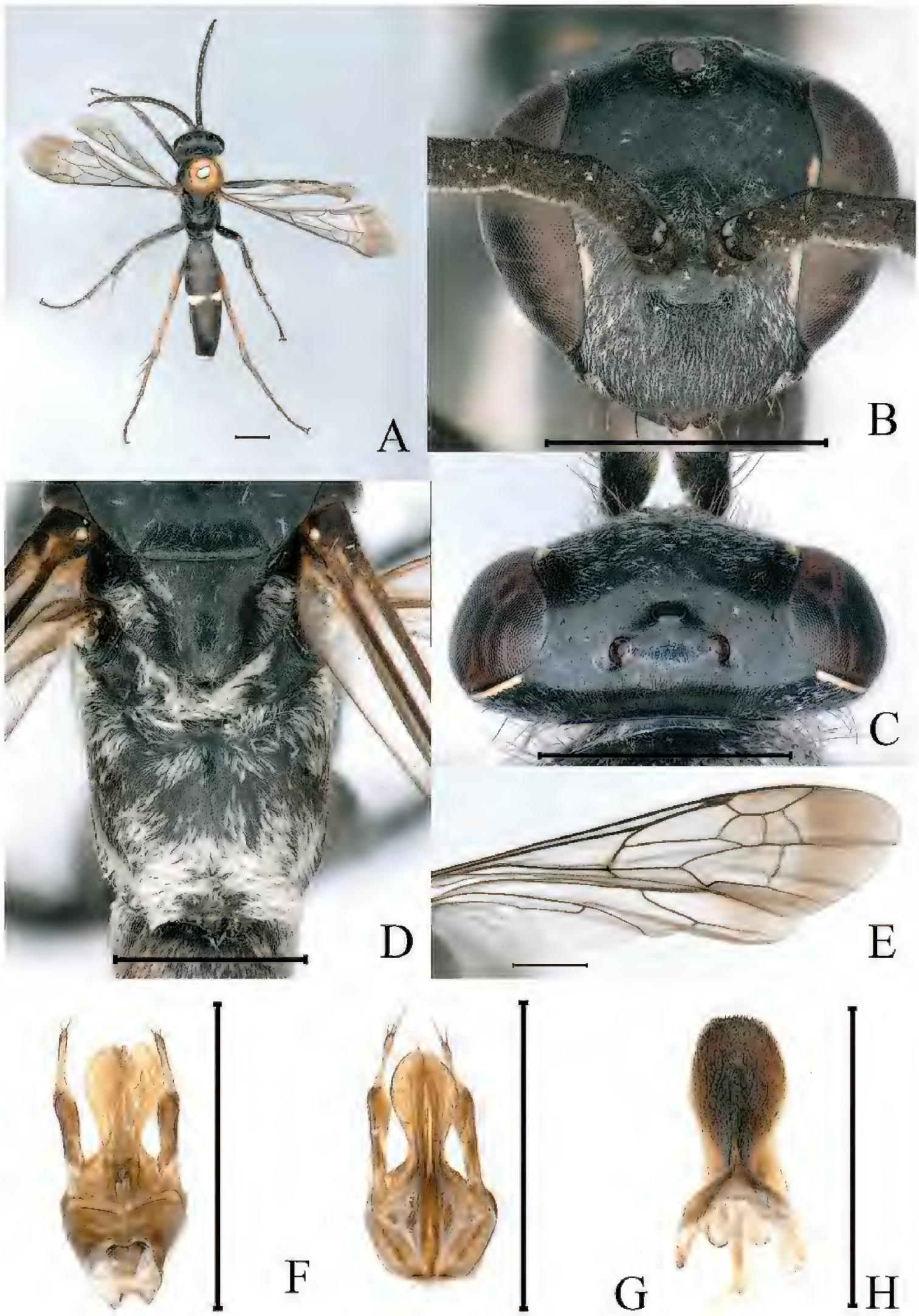

Figure 10. A–H. *Episyron rufipes* (Linnaeus, 1758), ♂. **A.** Male, dorsal view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Fore wing and hind wing; **F.** Genitalia, ventral view; **G.** Genitalia, dorsal view; **H.** Hypopygium, ventral view. Scale bar: 1.0 mm.

entirely face of T7 (Fig. 10A–D). Apical of mid femora, half of hind femora, mid and hind tibia reddish; spur brown; squamiform pubescence usually brown (Fig. 9A, D). POD: OOD = 1.0–1.1; F1 length 1.5–1.71 times its maximum width (Loktionov and Lelej 2014; Kim 2022).

Distribution. Palearctic region: Russia: European part (North–West, Centre, East, South, North Caucasus, Crimea), Ural, Eastern Siberia (Irkutsk Prov., Buryat Rep., Zabaikalskii Terr.), Far East (Amur Prov., Khabarovsk Terr., Primorskii Terr., Sakhalin, Kamchatka Terr., Magadan Prov.), Asia: China (Inner Mongolia), South Korea, Japan (Honshu, Kyushu) (Mokrousov 2009; Mokrousov et al. 2013; Loktionov and Lelej 2014, 2017; Kim 2022).

Episyron rufotibialis Tsuneki, 1989

Episyron rufotibialis Tsuneki, 1989: 113.

Diagnosis. Female. Body length 9–10 mm. Body largely black, following markings creamy yellow: apical margin of clypeus narrowly lemon yellow, paired basolateral spots on T1, T2 and T5. Spines on tibiae brown, but on tarsi black, spur brown to dark brown, tarsomere 1 with three outer spines; wings very slightly yellowish and narrowly at apex fuscous; squamiform pubescence on pronotum, propodeum and Tl broadly (but not completely) expanded and bluish (Tsuneki 1989). **Male.** Unknown.

Distribution. China (Tsuneki, 1989).

Episyron rufotibius Anju, Girish Kumar & Thejass, 2024

Figs 11A–F, 12A–H

Episyron rufotibius Anju, Girish Kumar & Thejass, 2024: 565.

Material examined. CHINA • 41 ♀♀ 66 ♂♂; Yunnan, Yuxi City, Yuanjiang County; 23°18'N, 101°39'E; V–VI.2016 (12 ♀♀ 17 ♂♂), VI–IX.2016 (18 ♀♀ 11 ♂♂), IV–V.2016 (11 ♀♀ 38 ♂♂); Malaise trap (YNAU); CHINA • 2 ♀♀ 3 ♂♂; Yunnan, Yuxi City, Yuanjiang Ecological Station; 23°47'N, 102°17'E; 12.VII.2022; coll. Zhiyan Song; sweep net (YNAU); CHINA • 1 ♀; Yunnan: Xishuangbanna Tropical Botanical Garden, rainforest; 21°54'N, 101°16'E; III–IV.2019; coll. Yongsheng Pu, Malaise trap (YNAU); CHINA • 1 ♀; Yunnan, Jinghong City, Menghai County, Guanggang Village; 21°49'N, 100°29'E; 24.VII–23.IX.2019; coll. Malaise trap (YNAU); CHINA • 2 ♀♀; Yunnan, Yuanmou County, Xinhua Town; 25°71'N, 101°88'E; 4.X.2011; coll. Malaise trap (YNAU); CHINA • 1 ♀; Yunnan, Hekou County, Nanxi Town; 22°41'N, 103°27'E; VII–IX.2016; coll. Malaise trap (YNAU); CHINA • 2 ♀♀; Guangdong, Jieyang City; 23°55'N, 116°35'E; 1–10.VIII.2008; coll. Shihong Wang, sweep net (SCAU).

Diagnosis. Female. Length: body 9.2–14.5 mm; fore wing 8.4–11.3 mm. Body black, yellow marks as follows: broad yellow band along lower margin of clypeus, band narrow medially with "U" depression, and broad band on inner and outer orbits; posterior margin of pronotum creamy yellow, square mark near hind margin of mesonotum, spot on tegulae, paired basolateral roundish spots on T1, T2 and T3 (usually hidden), paired basal transverse large spots on T5 (sometimes connected) (Fig. 11A–D). Hind tibia reddish (apical black) (Fig. 11A). Wings hyaline, fore wing infuscate with light brown apical band (Fig. 11E). Face below with pale short pubescence; vertex, gena, pronotum, propodeum and T1 with dense, long, erect and white pubescence, apical metasoma with sparse brownish black setae; squamiform pubescence usually with bluish or yellow-green metallic reflection (Fig. 11D). Clypeus slightly convex medially, rounded anterior margin, its width 2.19–2.22 times length. MID width nearly 2.23–2.32 times eyes; LID: MID: UID = 60: 62: 37 (Fig. 11B). POD: OOD = 1.50–1.75. Flagellum filiform, F1 length 7.13–7.43 times its maximum width; SL: PL: F1: F2: F3: F4: F5 = 30: 10: 57: 33: 30: 25: 23. SMC2 receiving crossvein *1m-cu* at basal 0.65, SMC3 receiving crossvein *2m-cu* at basal 0.64. Hind wing crossvein *cu-a* arc-like, *M+CuA* vein fork before intersection of *cu-a* and *M+CuA* (Fig. 11E). Fore tarsus with cylindrical tapering spines, tarsomere 1 outside with three outer spines, tarsomeres 2, 3 with two outer spines, tarsomere 4 with one outer spine, tarsomere 5 without spine (Fig. 11F). Metasoma without petiole, apex of T6 slightly compressed (Anju et al. 2024).

Description of male. Body length 8.1–10.5 mm, fore wing 7.1–7.5 mm. Similar to female, yellow marks as follows: clypeus apically with broad band, band narrow medially with "U" depression or with one large yellow spot on each side; paired large spots on T3 basolaterally, paired small spots on T4 and T5 basolaterally (Fig. 12A–D). Hind tibia reddish (apically black), spines and spurs pale (Fig. 12A). Wings hyaline, fore wing infuscate with light brown apical band, pterostigma entirely brown (Fig. 12E). Face below with short pale pubescence; vertex, gena, pronotum, propodeum and T1 with dense long erect white pubescence, apical metasoma with sparse brownish black setae; pronotum, scutellum, metanotum, metapleura, metapostnotum, propodeum, dorsal surface of hind coxa and T1 with unevenly distributed large squamiform pubescence, and T2–3 also with few squamiform pubescence, usually with bluish or yellow-green metallic reflection (Fig. 12A–D).

Head. In frontal view, head width 1.18–1.19 times height. Mandible slender, with one apical tooth. Clypeus slightly convex medially, rounded anteriorly, its width 1.64–2.11 times length (Fig. 12B). Malar space short. Area between antennal sockets convex. Frons flat, with inconspicuous median line. Inner orbits nearly parallel below and slightly convergent above; MID width nearly 2.48–2.68 times eyes; LID: MID: UID = 42: 47: 38 (Fig. 12B). In dorsal view, ocelli approximately in obtuse triangle, ocellar area slightly raised; POD: OOD = 1.1–1.3 (Fig. 12C). In lateral view, gena 0.32–0.37 times eye width. Flagellum filiform, F1 nearly 1.43–1.70 times as long as wide, SL: PL: F1: F2: F3: F4: F5 = 15: 5: 12: 14: 14: 13: 12.

Mesosoma. Pronotum length in dorsal view 0.25–0.29 times maximum width, slightly converging toward base, posterior margin arcuate and slightly angulate medially. Mesoscutum with evident parapsidal line, from apical to 3/4 metanotum. Mesoscutellum and metanotum conspicuously convex medially. Metapostnotum narrow medially, posterior margin arcuately expanded, its length nearly 0.37–0.43 times metanotum (Fig. 12D). Propodeum slightly convex in profile, with uniform arcuate transition, length 0.77–0.83 of its maximum width (Fig. 12D).

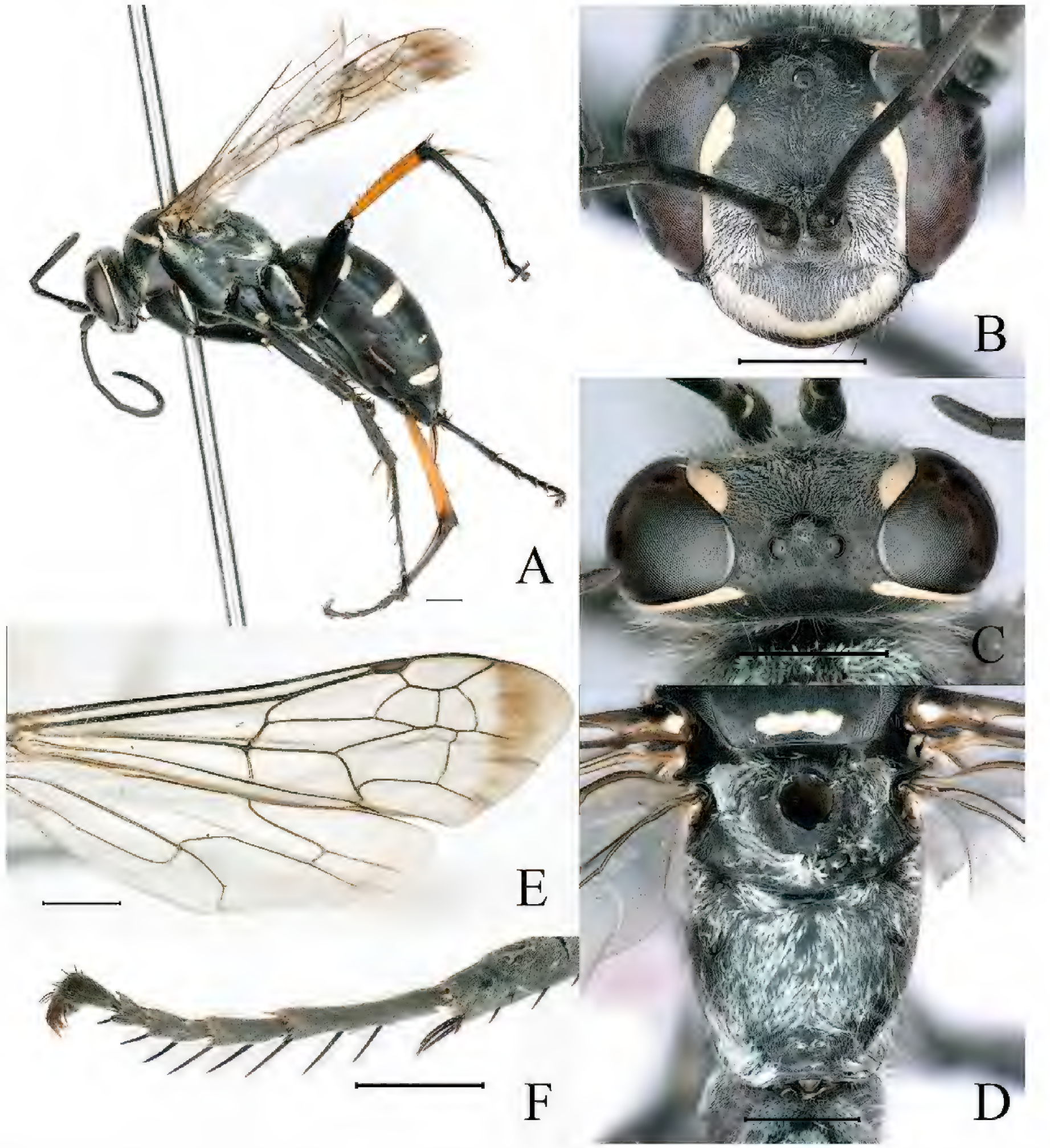

Figure 11. A–F. *Episyron rufotibius* Anju, Girish Kumar & Thejass, 2024, ♀. **A.** Female, lateral view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Fore wing and hind wing; **F.** Fore tarsus. Scale bar: 1.0 mm.

Wings. Marginal cell of fore wing nearly as long as its length from the wing tip (Fig. 12E). Pterostigma slender, its posterior margin parallel to anterior one. SMC2 long, and SMC3 narrows in upper part. SMC2 receiving crossvein *1m-cu* at basal 0.63–0.80, SMC3 receiving crossvein *2m-cu* at basal 0.61–0.63 (Fig. 12E). Hind wing crossvein *cu-a* arc-like, *M+CuA* vein fork before intersection of *cu-a* and *M+CuA* (Fig. 12E).

Legs. Fore tarsus without comb spines, long spur of hind tibia 0.79–0.90 times of metatarsus. Tarsal claws symmetrical and bifid, inner tooth broad and obliquely truncated.

Metasoma. Basal segment of metasoma much narrow, so that metasoma more fusiform than the others (Fig. 12A).

Sex association. All female and male specimens were collected from the same location, on the same dates, and in the same Malaise trap. They exhibit identical patterns and share the following diagnostic characteristics: a broad yellow band along the lower margin of the clypeus; reddish hind tibia (apically black); and squamiform pubescence usually displaying a bluish or yellow-green metallic reflection.

Distribution. China (Yunnan, Guangdong), India (Kerala) (Anju et al. 2024).

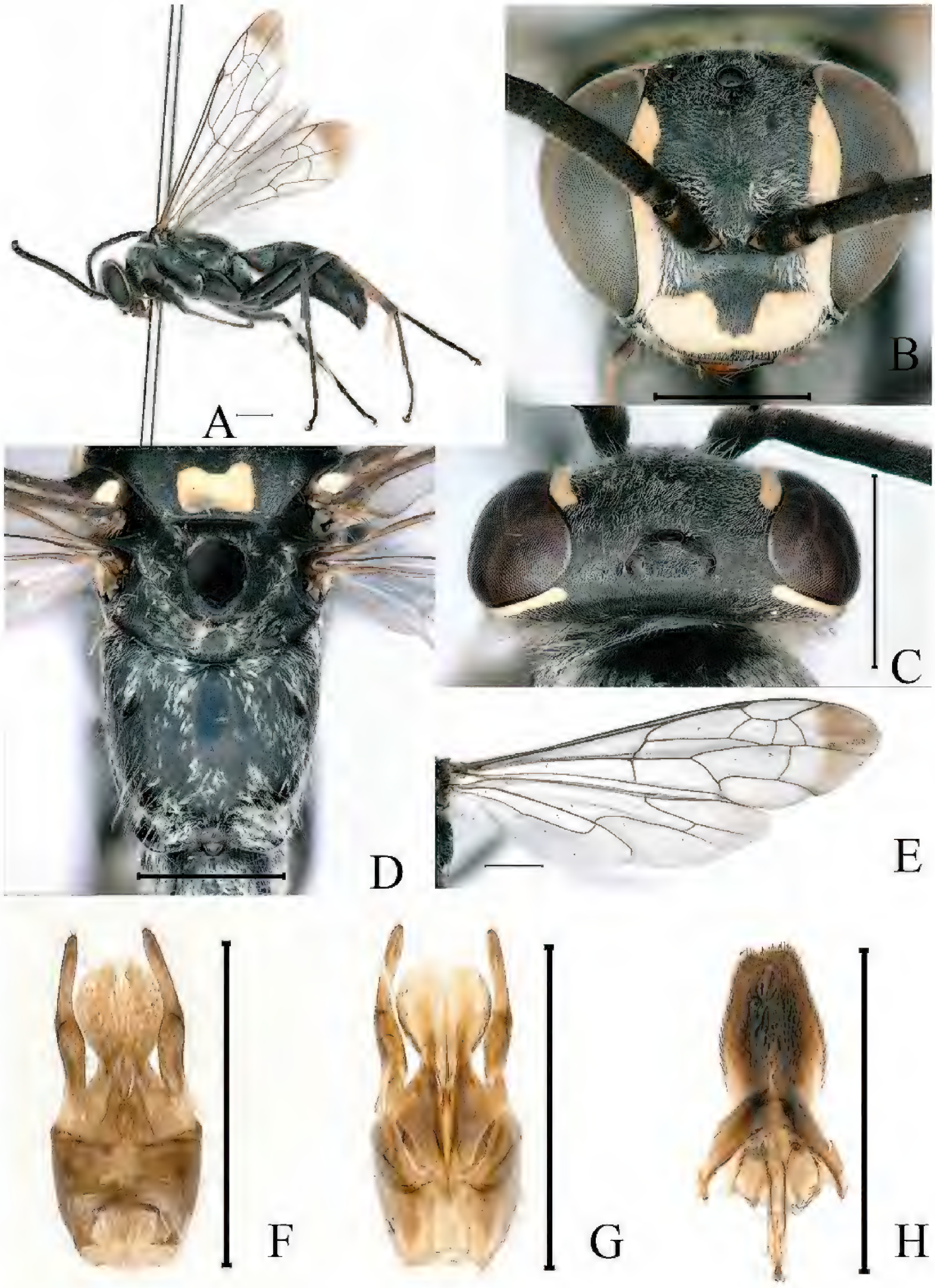

Figure 12. A–H. *Episyron rufotibius* Anju, Girish Kumar & Thejass, 2024, ♂. **A.** Male, lateral view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Fore wing and hind wing; **F.** Genitalia, ventral view; **G.** Genitalia, dorsal view; **H.** Hypopygium, ventral view. Scale bar: 1.0 mm.

Episyron vagabundus hopponis (Matsumura, 1912)

Figs 13A–F, 14A–H

Pompilus hopponis Matsumura, 1912: 184.

Episyron vagabundus hopponis Tsuneki, 1989: 108.

Material examined. CHINA • 1 ♀ 1 ♂; Yunnan, Dehong State, Lianghe County, Zhedao Town, Longhe Village; 24°45'N, 98°13'E; 5.V.2013; coll. Li Jiang; sweep net (YNAU); 2 ♀♀ 5 ♂♂, same locality as above, except coll. Jian Zhu, sweep net (YNAU); CHINA • 1 ♀; Yunnan, Yuxi City, Yuanjiang County; 23°18'N, 101°39'E; IV–V.2006; coll. Malaise trap (YNAU). CHINA • 8 ♀♀; Yunnan, Wenshan State, Maguan County; 22°48'N, 103°79'E; V–IX. 2017; coll. Malaise trap (YNAU); CHINA • 29 ♀♀ 20 ♂♂; Yunnan, Jinghong City, Menghai County, Guanggang Village; 21°49'N, 100°29'E; V–XI.2021; coll. Malaise trap (YNAU); CHINA • 5 ♀♀ 3 ♂♂; Yunnan,

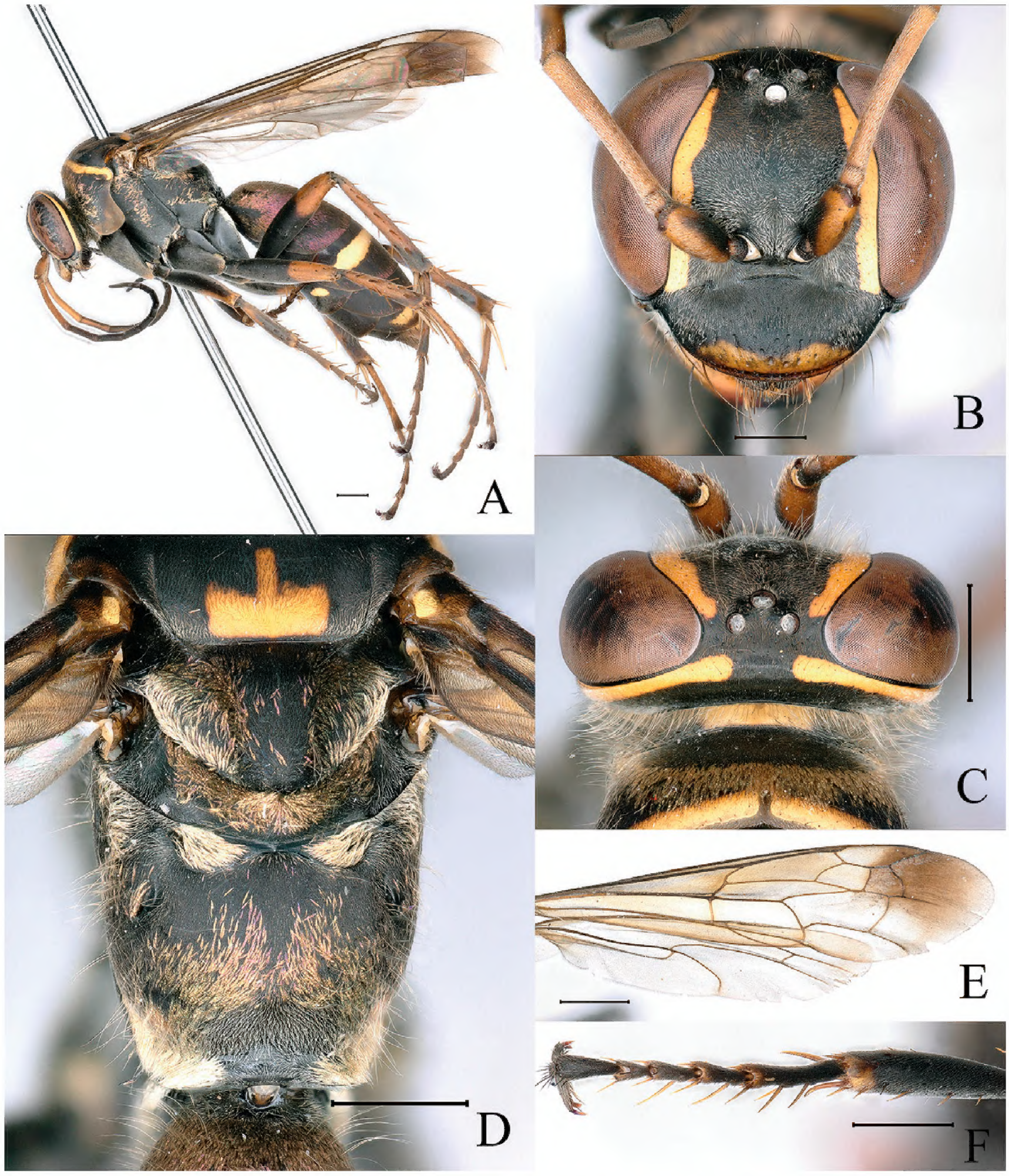

Figure 13. A–F. *Episyron vagabundus hopponis* (Matsumura, 1912), ♀. **A.** Female, lateral view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Fore wing and hind wing; **F.** Fore tarsus. Scale bar: 1.0 mm.

Xishuangbanna Tropical Botanical Garden, rainforest; 21°54'N, 101°16'E; 24.IV–31.V.2019; coll. Malaise trap (YNAU); CHINA • 6 ♀♀; Guangdong, Huizhou City, Nankun Mountain; 23°64'N, 113°89'E; 4–6.VI.2011; coll. Zaifu Xu, sweep net (SCAU); CHINA • 17 ♀♀ 24 ♂♂; Guangdong Nanling Mountain Nature Reserve; 24°45'N, 112°67'E; 16.VIII.2007–10.IX.2011 (10 ♀ 15 ♂♂); coll. Zaifu Xu; same locality as above, except collector and date; 8.VIII.2010 (2 ♀♀); coll. Huiting Chen; 8.VIII.2010 (4 ♀♀ 4 ♂♂); coll. Huayan Chen; 24.VIII.2010 (5 ♂♂); coll. Xiaoli Li; 9.VII .2004(1 ♀); coll. Jie Zeng; sweep net (SCAU); CHINA • 4 ♂♂; Fujian, Minqing County, Meiyanglin Forest Park; 26°14'N, 118°56'E; 13.VII.2005; coll. Jinxian Liu; sweep net (YNAU).

Diagnosis. Female. Body length 10.7–16.5 mm, fore wing 7.2–11.8 mm. Body largely black, following markings creamy yellow: broad band on inner and outer orbits, apical margin of clypeus broadly, without median constriction or separation, antenna 1-4(5), posterior margin of pronotum, a large medio-posterior transverse mark of mesoscutum, tegula (sometimes wholly, sometimes in two or three spots); paired basolateral round spots on T2, paired basal band on T3, paired basal transverse large spots on T4 (sometimes connected), on T5 in variously twice constricted band, on GT6 in a large basal mark and on S6 spread completely over whole (Fig. 13A–D). Apical third of all femora, tibiae, spurs, tarsomere 1 and spines, and tarsomere 2 partly

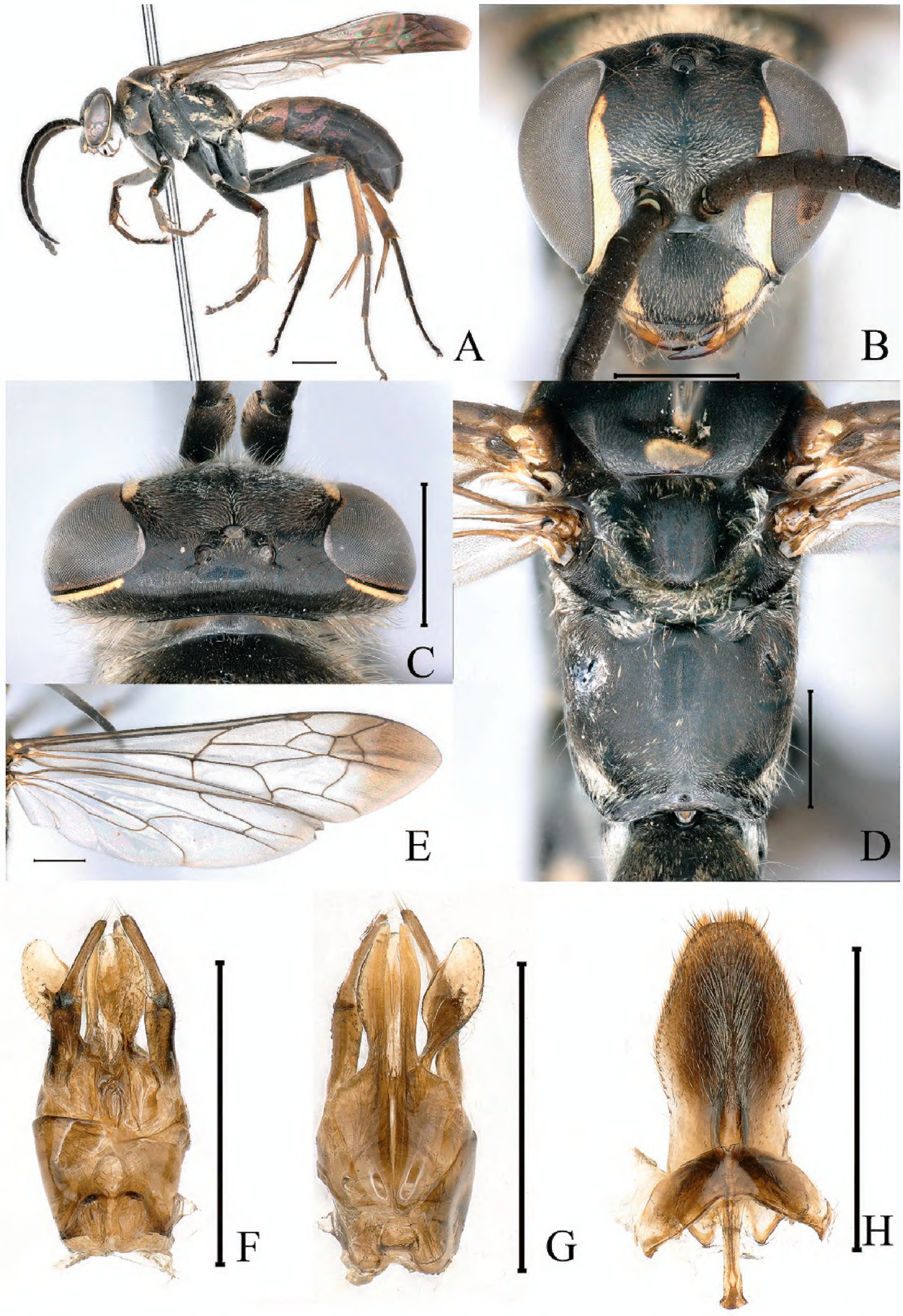

Figure 14. A–H. *Episyron vagabundus hopponis* (Matsumura, 1912), ♂. **A.** Male, lateral view; **B.** Head, frontal view; **C.** Head, dorsal view; **D.** Postnotum, propodeum, dorsal view; **E.** Fore wing and hind wing; **F.** Genitalia, ventral view; **G.** Genitalia, dorsal view; **H.** Hypopygium, ventral view. Scale bar: 1.0 mm.

yellowish or brown, rest of tarsi pale or dark brown (Fig. 13A). Squamiform pubescence on metanotum, postnotum and propodeum brown yellow, on Tl-3 coppery (Fig. 13A, D). **Male**. Body length 7.1–11.5 mm; fore wing 6.4–11.0 mm. In addition to spots seen in female, two lateral spots of clypeus; baso-lateral marks of T3 (usually concealed) and a mark on T7; hind tibia red, with obscure orange stripe on outer margin at base; apical margin beneath of coxae and a spot above of fore femur whitish yellow; apices of mid and hind femora

and mid tibia on outer side slightly reddish; spur except apical part and spines pale (Fig. 14A–D). Squamiform pubescence on Tl-3 coppery, but on metanotum, postnotum and propodeum white, with somewhat a yellow shine (Fig. 14A, D) (Tsuneki 1989).

Distribution. China, Japan (Tsuneki, 1989; He et al. 2004).

Discussion

The coloration of species within the genus *Episyron* varies significantly, often exhibiting yellow to fulvous maculation on the head, mesosoma and metasoma. However, different species are distinguished by the presence or absence of maculation, rather than by the variations in size or shape. Species in this genus are distinguished by body coloration, patterning, and morphometric measurements. For instance, in the African region, *Episyron braunsii* Arnold, 1936, which is morphologically similar to *Episyron bicinctus* Bisch, 1913, can be differentiated by the width of the vertex, length of the pronotum, and the structure of the wing veins. Because females of this genus often nest in soil, they typically possess robust tarsal combs on their forelegs. Species such as *E. albonotatum*, *E. arrogans* and *E. rufipes* exhibit relatively wide distributions within the Palearctic region, occurring in multiple countries including Russia, France, and China. In this study, two new species and three newly recorded species for China are reported. Accordingly, the known *Episyron* diversity in China has increased from three species and one subspecies to eight species and one subspecies, representing approximately 9% of the global diversity of *Episyron* (87 species and 13 subspecies). This increase in species richness can largely be attributed to the presence of *Episyron* in both the Palearctic and Oriental regions, and may also be influenced by extensive collection efforts. As noted by Pu et al. (2022), vegetation diversity plays a crucial role in shaping spider wasp diversity, and seasons with high temperatures and low humidity are particularly favorable for their growth and reproduction. Consequently, a diverse climate, complex terrain, and varied vegetation types contribute significantly to increase spider wasp diversity.

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